S. HRG. 109–22, PT. 2

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

ON

S. 1042

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2006 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 2
SEAPOWER

APRIL 12 AND 19, 2005

Printed for the use of the Committee on Armed Services

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

TUESDAY, APRIL 12, 2005

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVY SHIPBUILDING AND INDUSTRIAL BASE STATUS

The subcommittee met, pursuant to notice, at 4:00 p.m. in room SR–232A, Russell Senate Office Building, Senator James M. Talent (chairman of the subcommittee) presiding.

Committee members present: Senators Talent, Collins, Lieberman, and Reed.

Majority staff members present: Gregory T. Kiley, professional staff member; and Thomas L. MacKenzie, professional staff member.

Minority staff member present: Creighton Greene, professional staff member.

Staff assistants present: Alison E. Brill and Benjamin L. Rubin.

Committee members' assistants present: Mackenzie M. Eaglen, assistant to Senator Collins; Lindsey R. Neas, assistant to Senator Talent; Frederick M. Downey, assistant to Senator Lieberman; and William K. Sutey, assistant to Senator Bill Nelson.

OPENING STATEMENT OF SENATOR JAMES M. TALENT, CHAIRMAN

Senator TALENT. The subcommittee will come to order. I am going to start my opening statement. I expect Senator Kennedy will arrive while I am giving it and, given the lateness of the hour and the fact we were interrupted with a vote, in order to maximize your time, Admiral, I will just go ahead and convene the subcommittee and we will begin.

The subcommittee meets today in open session to receive testimony on shipbuilding and on the shipbuilding industrial base. We have just left a very informative closed session with the Chief of Naval Operations, Admiral Vernon Clark, who has been kind enough to give us more time today as the first panelist in this open hearing. Thank you again, Admiral, for taking time out of your busy schedule to be here.

In our second panel this afternoon we have: Michael Toner, the Executive Vice President of Marine Systems for General Dynamics;

Dr. Philip Dur, the President of Northrop Grumman Ship Systems; and Ronald O'Rourke, a recognized expert on naval matters from the Congressional Research Service (CRS). I want to thank those gentlemen as well for being here this afternoon.

This is an extremely important hearing and the issues are complex. There has been a tremendous amount of rhetoric surrounding the shipbuilding budget this year. There is no doubt that there are significant budgetary pressures on the Department of the Navy. Those pressures have certainly driven some of the decisions that have been made, such as slipping the delivery of CVN–21 and reducing the production rates of surface combatants and submarines.

The overarching issue, however, budget pressures aside, is what is the size and composition of the Navy that we need. Having read the written testimony from members of our second panel, I think we will find that what the shipbuilding industry needs first and foremost is stability. The first step in achieving that stability in the industry is to lay out a plan. The second step would be to stick to it.

The interim Navy plan delivered last month was, in the words of Mr. O'Rourke from our second panel in his written testimony, "not a plan but a 30-year projection of potential Navy force levels," from which potential annual shipbuilding rates can only be partially inferred. No one argues that plans should remain unchanged, but they should not change each and every year. Mr. Toner points out in his written testimony that the procurement plan for a *Virginia*-class submarine has changed 12 times in the last 10 years. The procurement plan for DD(X) has been no more stable.

As far as what the size and shape of the Navy should be, the last plan on which there was consensus was the 2001 Quadrennial Defense Review (QDR). By statute, this review is required to outline what is required to execute the national military strategy with no more than moderate risk. In 2001, for the Navy that resulted in a force that included: 12 aircraft carriers, 10 active and 1 Reserve air wings, 12 amphibious ready groups, 55 attack submarines, 108 Active and 8 Reserve surface combatants.

Two years ago, to support Sea Strike, Sea Shield, and Sea Basing pillars or the Sea Power 21 vision, a force structure of 375 ships was postulated, which would have included 12 carriers strike groups, 12 expeditionary strike groups, 9 strike or missile defense surface action groups, and 4 guided missile submarines for strike and Special Operations Forces.

Certainly the Navy has made great strides in trying to do more with less. Experimentation with Sea Swap to increase a ship's forward presence, implementation of the fleet response plan to provide presence with a purpose, and integration of the Navy and Marine Corps tactical aviation forces all have contributed to providing more naval combat power for every tax dollar spent. These efficiencies are noteworthy, but it is my belief that efficiencies can go only so far before risk and perhaps unacceptable risk to the national security is introduced.

Our ships and aircraft have more capability than ever before in history. The requirements process is now defined in terms of capabilities rather than threats and I think that is largely appropriate.

But even the most capable ship or airplane is of little use if it is not in the right place at the right time.

Perhaps the problem since the end of the Cold War has been in defining the threat. An article for the New York Times just last week, on April 8, stated that "China is quietly challenging America's reach in the western Pacific by concentrating strategically on conventional forces," and that in the worst case in a Taiwan crisis, Pentagon officials say that any delay in American aircraft carriers reaching the island would mean that the United States would initially depend on fighter jets and bombers based in Guam and Okinawa, while Chinese forces could use their amphibious ships to go back and forth across the narrow Taiwan Strait.

With China's acquisition of modern surface ships, submarines, and aircraft, combined with the fact that naval forces would be critical to having a chance of success in such a scenario, perhaps it is time to start thinking about what level of naval power is required to deter a potential threat.

I keep coming back to something that has been repeatedly stated by officials in and out of uniform in testimony before this subcommittee: numbers count. Capability is important, maybe more important than we used to think it was, but numbers count, and the numbers are moving in the wrong direction.

I also think that in a world where the threat is not as defined as it was during the Cold War numbers may count even more, especially for the Navy since transit times are so long and most of the world is still covered by oceans. Increased capabilities are needed, to be certain, but so are increased numbers. If resources prevent that, then maybe more resources are needed.

There is a new national military strategy and a new QDR that has been started. Hopefully, it will take into account both the capabilities and numbers that will be required across the spectrum of warfare globally and to deter first and defeat if necessary.

That is the end of my opening statement. If everybody will stand by just a second. Now I understand why Senator Kennedy is not here. Another vote has been called. Let me recess the subcommittee for just a second, and I am going to talk to you, Admiral, about your time. So we will just stand in recess for a minute. [Recess from 4:08 p.m. to 4:09 p.m.]

I am going to go vote and then we will continue in recess and we will come back and open this subcommittee hearing. [Recess from 4:10 p.m. to 4:16 p.m.]

Senator COLLINS [presiding]. The subcommittee will come to order.

Admiral Clark, you know very well that I have always wanted to be the chairman of the Seapower Subcommittee, and for the next few moments until Senator Talent arrives I am going to assume that role with his permission. I hope that does not fill you with apprehension in any way.

Admiral, you and I have worked together for many years now and I very much appreciate the contributions that you have made in service to your country. I have been very concerned about the shipbuilding budget, especially this year, but also previous years when I felt shipbuilding was underfunded. You and I have talked many times about a shipbuilding budget that should be in the

neighborhood of $10 billion to $12 billion a year in order to keep us on track. We did a little better for a few years, but now, unfortunately, we seem to be going backward.

I understand the budget constraints. You were very frank about that when last you testified before the full committee. I am very concerned in particular about the reduction in the number of DD(X)s, particularly since you have testified that the military requirements have not changed, that you still see a need for about a dozen. That suggests to me that the answer is for us to explore alternative ways of funding ships, ways that would recognize that trying to fully fund a DD(X) in 1 year may not be the best approach.

I know you tried, and I completely supported you, last year to construct the first DD(X) in the research and development (R&D) account, and we have talked about other ways. Could you elaborate on funding mechanisms that you believe would allow us to build more ships and would be a more effective and efficient way for reaching goals that I know we both share?

STATEMENT OF ADM VERNON E. CLARK, USN, CHIEF OF NAVAL OPERATIONS

Admiral CLARK. Thank you, Senator. I very much appreciate the chance to take on that issue because I believe that really is the issue in front of the subcommittee today. Do you have a copy of my statement? Did I give you one?

Senator COLLINS. I do have it.

Admiral CLARK. So, if we could, I would like to answer the question by going to page 11 and looking at the chart there, figure 7, if you will.

Senator COLLINS. Yes, thank you.

Admiral CLARK. Figure 7 proposes a level funding approach to shipbuilding. In the early part of my statement I talk about the requirement for us to deal with shipbuilding as a national investment issue and I believe that is what is required.

Also, earlier in the written statement I have a graph that talks to and shows the investment level that we have witnessed in real terms over the course of the last 15 years. So I believe that what we are facing here is a couple of issues. The first one is the level of funding and the second one is the methodologies that we are using to get the funding accomplished.

In figure 7, there is no number on the vertical column, and we could talk about various levels, and so I took the numbers out of the platforms also. But I had the staff work up what would happen if the Nation said, Okay, we are going to spend X every year. The methodology would be that we would be given the tools to manage inside that fixed amount that I believe would greatly, in my discussions with the shipbuilders, help them to figure out what they are supposed to do.

A study was just completed recently by National Defense University in the shipbuilding industry. The results of the study point out that there are a number of issues that affect the shipbuilding industry. One of the realities is that we have more capacity than we are certainly burning up by buying the numbers of ships that we are.

In order for them to properly size themselves, they do have to know where they are going. Chairman Talent in his opening statement talked about the requirement for stability and I understand that and appreciate it and would very much like to be in that kind of position. So this chart represents to me what it is we have to do. Not only do we have to have a level income stream, we have to have the rules and regulations that allow us to operate inside that level income or investment stream. What that means is we ought to use any tool that we think would make it work better.

When I appeared before the full committee, I asked the chair to bring the shipbuilding industry in here, have them talk about their perspective of this. I cannot give their perspective. But I have talked to them and I understand what their issues are with second and third order supply chains, and the current methodology simply is not meeting our needs. How long do we have to watch this happen to come to the conclusion that it is not meeting our need?

So what you see there is the top section, the carrier. The carrier now takes a number that would eat up the entire annual investment that we have made over the last 15 years and then some if we are going to buy a carrier in a given year. What people do not even imagine when they see this is what it does to the rest of my budget and the rest of my program. It takes divots of ineffectiveness and inefficiency out of the rest of my programs to try to do those kinds of things.

That means that I have to have authorities and tools that allow me to fund the activity inside a balancing kind of a line that gives you a fixed investment stream.

Senator, I believe the bottom line is you cannot have the Navy of your dreams with the mechanisms that we are using and have used for the last 15 years, and something like this has to be done. If this is not the perfect answer, I am willing to look at any other option. I have put forward split funding. I have put forward advanced approps and incremental appropriations in the old R&D program.

By the way, you mentioned DD(X). By my estimates—and I am not the acquisition czar, so I will not attest that these are perfect—but the requirement and the result of the congressional action last year and then the resulting budgetary action that we have had to take as a result has cost that first ship something in the tune of $380 million, $390 million. We still do not have the ship. So this is not the way to do it.

Senator COLLINS. Admiral, I think your point is an excellent one. This not only is an inefficient way, the current approach, to shipbuilding, but it also ultimately costs us more money.

Admiral CLARK. It does.

Senator COLLINS. That is what is particularly frustrating about the approach. It is not good for the Navy; it is not good for the shipbuilders; it is not good for our national security; and it is more costly to the taxpayers.

If I could summarize your answer, your testimony, and our previous discussions, it seems to me what you are advocating is a multi-year approach, level funding so that we do not have these huge peaks and valleys, an even workload, which helps the indus-

trial base retain those skills that are so important, and a dependable funding stream.

One of the problems, which the chairman has alluded to and you have echoed, is the instability in funding is very difficult for the shipbuilders to deal with, for the Navy to deal with. But I think your point is excellent, that ultimately it gets us fewer ships and it costs us more money.

Mr. Chairman, I know how hard you have worked on this issue and I hope that we can come up with a better approach for shipbuilding that meets the goals and uses the attributes that the Chief of Naval Operations (CNO) has suggested. I want to commend your leadership on this because you have worked very hard.

I do have one other question, but I know I am no longer the chairman now that you have returned. So I will give back my time.

Senator TALENT [presiding]. I am willing, if Senator Kennedy has not returned, to go right to you after this. We are doing this to some degree on the fly, but I wanted to give the Admiral a chance to actually give a statement if you want to, and perhaps you could pull out the parts that you think are the most important and give those. Then if Senator Kennedy has not returned, I will be happy to go to you for your questions, Senator Collins.

Admiral CLARK. Thank you, Mr. Chairman. Let me just briefly say a couple of things. First, I do appreciate the fact that you are having this hearing. I believe that this is very, very important. I believe it is important for the Navy. I believe it is important for industry. Ultimately, I believe that makes it very important for America. Certainly it is of great importance to the Navy.

I believe that the question of the industrial base and the state of shipbuilding is something that the United States should be concerned about. I said in the hearing with the full committee that I believe this to be a national security issue, and I want to reinforce this point. We are a maritime nation still. Even though the world is getting smaller and globalization is changing the way the economy works and all of those pieces, we are still an island nation.

The economy's dependence upon safety on the seas is absolutely without question. We know that well over 95 percent of the international product moves by sea and over 80 percent of the value. This is not hypothetical. This is not mythical. This is reality, and we need to confront reality and understand what the requirement is for us to be able to command the seas.

I want to make this point. We have worked hard inside the Navy to present an approach where we were trying to do our part. The budget that is before you and the cumulative savings over the time I have been the CNO are now over $50 billion. We have tried to do our part to run this Navy more effectively and more efficiently.

The fact remains that I am losing buying power, and I am losing buying power in the segment of the industry that my future depends upon. So as I said in the written statement, our shipbuilding priorities must in my view reflect the changing strategic environment that we see.

The requirement for more speed and agility in the future. That said, in my written statement I bring up again the issue of escalating costs and the loss of my buying power, and that is what I think makes this hearing so important.

I believe that the greatest risk that we face is the spiraling cost of our product. Now, it goes without saying that our product today is better than it has ever been, and I want to make no bones about it. Unapologetically, I tell you that I am bringing recommendations up here to buy the best stuff I know how to buy for the sons and daughters of America. We are investing in capabilities that will make the long-term cost of our Navy much lower. In other words, the operating costs for these platforms are significantly less than the platforms that they are replacing.

So that leads me to this; I believe that we have to form partnerships with Congress, with industry, and with the Navy that regain our buying power. I believe that we have to pursue acquisition reform. I believe that it is time for us to analyze the structure that we have. Let us have the courage to see if our system is serving us well. It is hard for me to imagine that we would come to the conclusion that the methodologies that we are using are working well for us.

It is clear to me that if we do not do this, find these better mechanisms to help build the ships and submarines of the future, that we cannot build the Navy that we believe we need in the 21st century. I also believe that there is no stand-alone single point solution. In other words, if the solution today became to incrementally fund a product in fiscal year 2006 without the wherewithal for me to deal with the incremental funding challenges that would exist when we did a series of new starts in 2006, I cannot stand that kind of approach to budgeting either.

My written statement includes a notional chart that is I believe very important, and it shows how level funding can more efficiently create and sustain a Navy between 260 and 325 ships. Mr. Chairman, I would love to get into your question about the exact numbers, whether it is 325, 260, or 375, and I think that that would be a worthwhile discussion.

I do advocate that we take on an approach that uses any funding mechanism we can figure out how to use, that will advantage the industry, make it more competitive, allow us to attack costs at every segment of the production process.

Finally, I believe that anything that we do must be done in partnership with the industry and that we should do everything possible to improve our ability to efficiently produce ships. For that reason, I congratulate you, Mr. Chairman, for making them part of this hearing today, and I look forward to your questions.

[The prepared statement of Admiral Clark follows:]

PREPARED STATEMENT BY ADM VERN CLARK, USN

Mr. Chairman and members of the Committee, I want to express my gratitude on behalf of the men and women of your Navy for holding these hearings. These marvelous Americans—Active and Reserve, uniformed and civilian—will continue to make this nation proud as they take the fight to today's enemy, while steadily transforming our institution to meet tomorrow's challenges. Our ability to attract, train, and retain them is a testament to the health of our Service and an indicator of our proper heading as we chart our course into the future. It is also important that we provide them with every advantage—especially regarding the ships they operate—to fight and win.

Our force structure was previously built to fight two major theater wars. However, the strategic landscape is vastly different today, and this change requires additional capabilities to accommodate a wide array of missions (Figure 1). The dependence of our world on the seas, coupled with the growing challenge for all nations to ensure access in a future conflict, will emphasize the need for a decisive maritime capability able to excel in an increasingly joint environment. Emphasis on the littorals and the global nature of the terrorist threat will demand the ability to strike where and when required. Therefore the maritime domain will increase in importance as a key maneuver space for U.S. military forces.

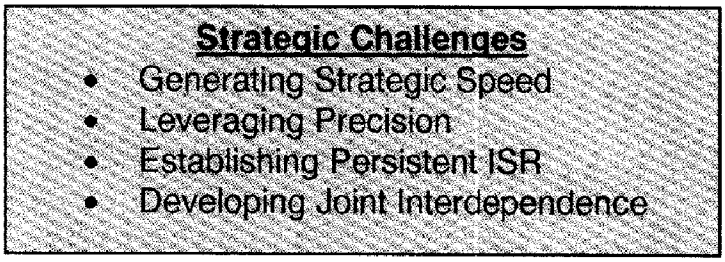
We will continue to face the requirement to deal with traditional warfighting challenges on the high seas and ashore. We must also address the growing 21st century realities of increasing scope and scale of small-scale contingencies, such as stability operations and peacekeeping requirements, and the need to extend combat capability to deeper and longer ranges inland. The future will demand the ability to confront irregular, catastrophic, and disruptive challenges that are being introduced today and will grow over time.

Strategic Challenges

To meet these challenges, we must improve our strategic speed to move significant, joint combat power anywhere around the globe. U.S. military force must be immediately employable and rapidly deployable, seizing and maintaining the initiative in any fight, anywhere.

Second, we must continue to develop "precision." As precision weaponry becomes commonplace throughout the joint force, we must develop concepts of operation and doctrine to maximize these powerful capabilities.

Third, we must establish an "unblinking eye" above and throughout the battlespace. Technological leaps in miniaturization have begun to make possible an increasing array of unmanned sensors, along with the communications networks and command and control (C2) capacity to yield pervasive awareness of the battlespace.



We must also continue to develop the fullest measure of joint interdependence. We are more effective as a fighting force, and more efficient with taxpayer dollars, when service missions and doctrine are designed from the start to be fully integrated.

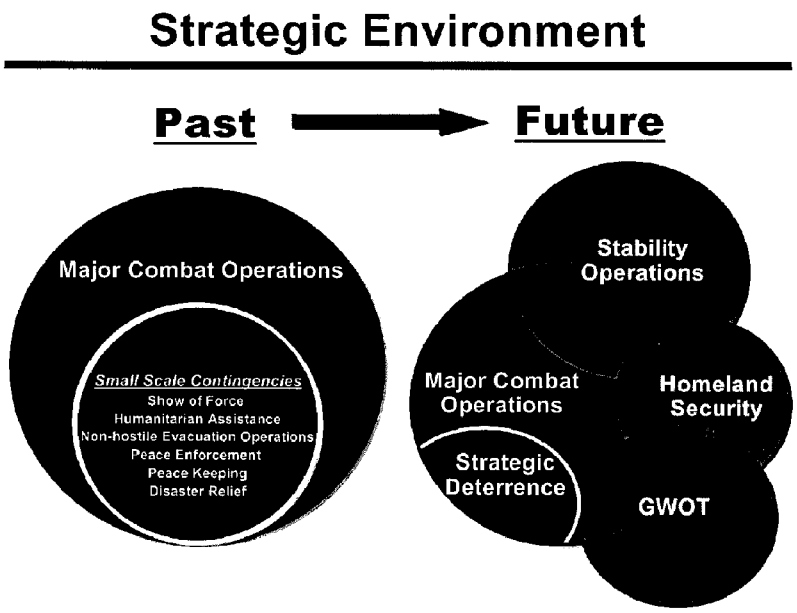


Figure 1

Strategic Necessities: Speed & Agility

Speed and agility are the attributes that will define our operational success. The importance of these qualities extends to the very foundations of our institution, whether we're talking about our personnel system, the size and adaptability of our technological and industrial bases, the design and function of our supporting infrastructure, or the financial planning necessary to put combat power to sea. Speed and agility, while defining our operational response, also need to characterize our acquisition process. We must find new and better ways to develop and field emerging technologies. The cycle in which this occurs needs to be measured in months not years.

The drive to increase our speed and agility means increasing the operational availability of our forces. It means developing a base structure to ensure that we are best positioned to win. It means challenging the total joint force to be light enough, and possess the required sustainability, to deliver adaptive capability packages on shorter timelines.

Force Capabilities

The number of ships in the Fleet is important. But it is no longer the only, nor the most meaningful, measure of combat capability. Just as the number of people is no longer the primary yardstick by which we measure the strength or productivity of an organization, the number of ships is not the only way to gauge the Navy's health or combat capability. The capabilities of the Fleet and its location around the world are most important. In fact, today's Navy can deliver more combat power than we could 20 years ago when we had twice as many ships and half again as many people. Figure 2 for example shows, the effects of technology and new operational concepts that leverage the greatly increased capabilities of today's Fleet.

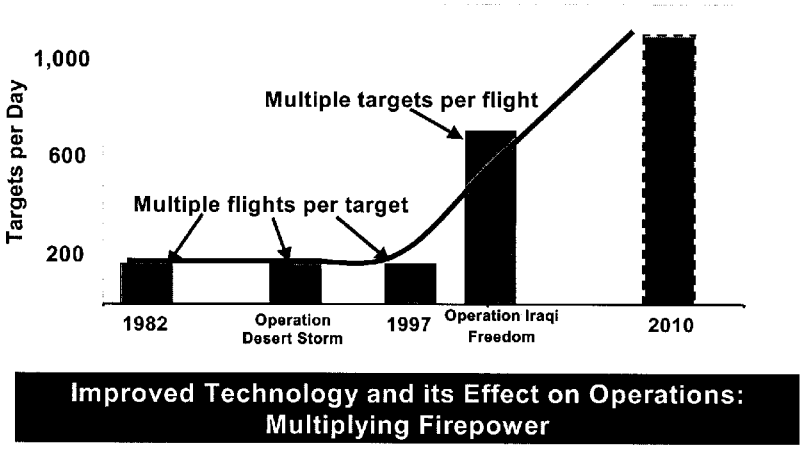


Figure 2

II. CURRENT SHIPBUILDING

Our shipbuilding priorities reflect emerging strategic challenges, the operational requirement for speed and agility, and an understanding of evolving force capabilities. My testimony to Congress on this subject over the last 5 years has reflected these priorities and been consistent. My themes have been and remain:

- The acquisition mechanisms we possess today will not produce the Navy we are going to need in the 21st century.
- This highly industrialized segment of the military-industrial complex does not respond well to peak and valley, sine-cosine investment approaches.
- The ship procurement rate—dating back to the procurement holidays of the 1990s—was insufficient to maintain objective force levels and is now manifesting itself in the health of the shipbuilding industry.
- We need a system which better partners with Congress and industry to regain our buying power. Acquisition reforms and other approaches that help to stabilize production will, in our view, reduce the per unit cost of ships and increase the shipbuilding rate.
- We need a level investment approach in this industry, that when coupled with other innovations, will change the economic underpinning of shipbuilding.

In no other area of our Armed Forces do we make such large capital investments that, in turn, impact important technological and industrial sectors of our economy.

Shipbuilding Cost Growth

Among the greatest risks all Services face is the spiraling cost of procurement for modern military systems, and shipbuilding is no exception (Figure 3). When adjusted for inflation, the cost increase in every class of ship that we have bought over the past 4 decades has been incredible.

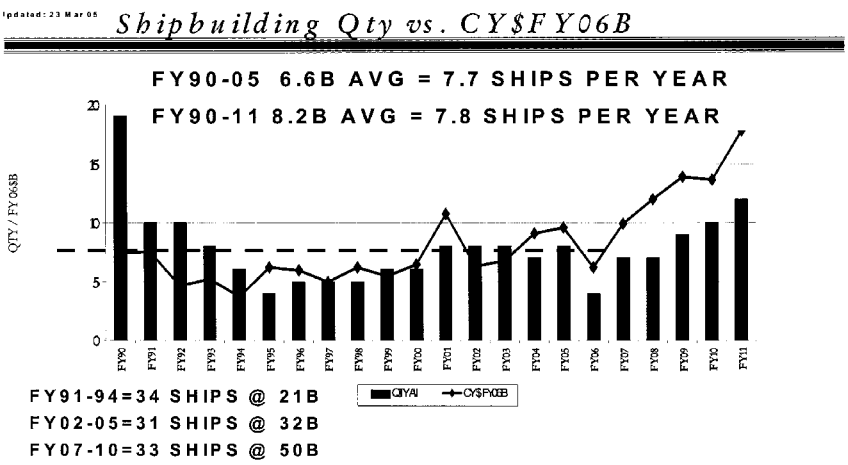


Figure 3

This tremendous increase in cost runs counter to other capital goods like automobiles, where the inflation-adjusted cost has been relatively flat over the same period of time.

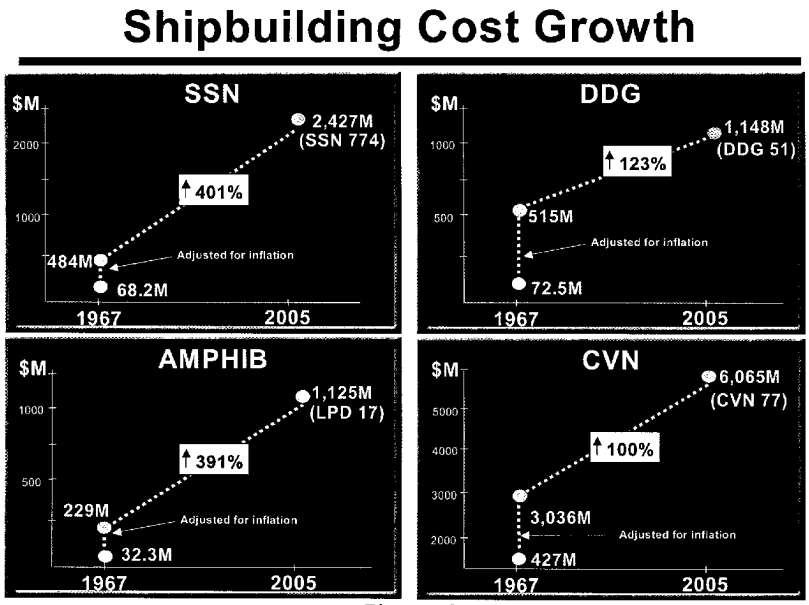


Figure 4

Figure (4) shows that shipbuilding costs have grown tremendously over the past 4 decades. Although newer ships emphasize greater combat capability, propulsion power, and computing technologies than their predecessors, costs have spiraled out

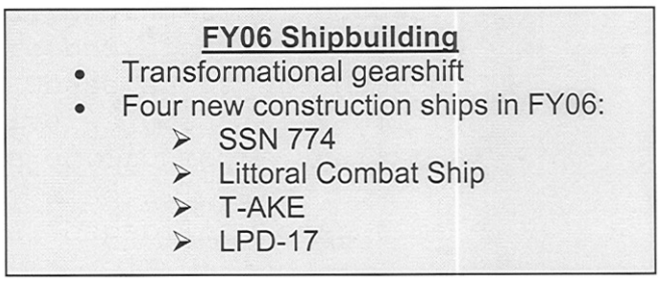
of control; cost growth that is not explainable solely due to enhanced complexity or reduced economies of scale.

This cost spiral comes at a very challenging time because, for the first time in decades, we are building entirely new types of ships in fiscal year 2006 and beyond. These ships are needed because their modular nature will give us great flexibility and adaptability to fight in diverse environments against a variety of enemies. Such modularity also allows us to dramatically expand their operational capability over time with less technical and fiscal risk.

Fiscal Year 2006 Budget Request

As the budget is finalized in the coming months, there will be a number of issues and processes that will impact shipbuilding across the Future Years Defense Program (FYDP), including the cost of war in Iraq, Base Realignment and Closure decisions, and the findings of the Quadrennial Defense Review. With that in mind, our Navy budget request for fiscal year 2006 includes four new construction ships.

Our original plan was for six new construction ships but Congressional action and shipyard factors prevented funding the final two ships. Our investment plan across the FYDP calls for 49 new construction ships, including DD(X), LHA(R), MPF(F), CVN–21, and SSN 774s. These new ships reflect our focus on the next generation of naval combatants and sea basing capabilities.



The requirement for shipbuilding will be shaped by emerging technologies, the amount of forward basing, and innovative manning concepts such as Sea Swap. Additional variables include unit operational availability and the evolving capabilities needed to perform our missions.

The following notional diagram (Figure 5) illustrates how innovative manning concepts and technological adaptation modify the number of ships required. The blue and yellow lines represent levels of combat capability and the ships required to achieve that capability. For example, the left side of the diagram shows our current number of ships (288) and a projection of ships required to meet global war on terror requirements (375) using traditional deployment practices. The right side of the diagram estimates the number of ships needed to achieve equivalent combat power after fully leveraging technological advances and employing the maximum use of Sea Swap. The middle portion of the curve (in the red ellipse) shows a range of ships that assumes a less extensive use of technology and Sea Swap. This diagram illustrates how the application of new technologies and manning concepts will enable us to attain our desired future combat capability with a force structure between 260 and 325 ships.

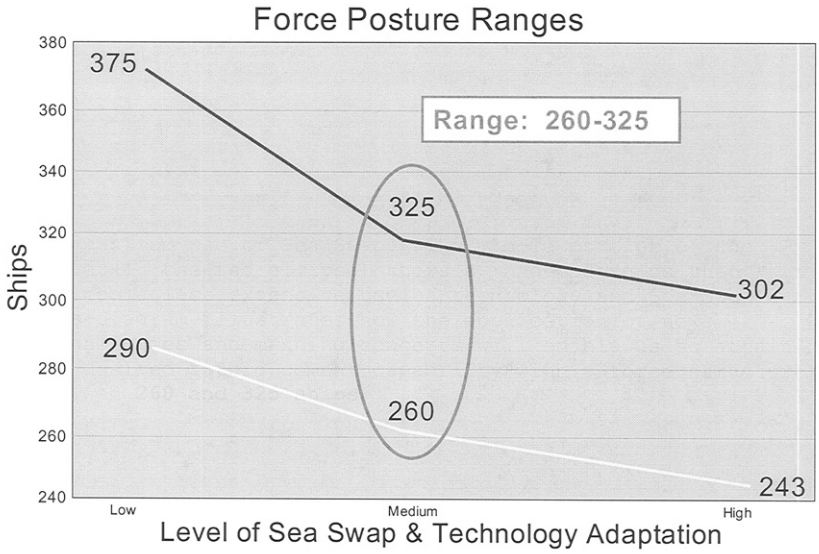


Figure 5

The power of the joint force in Operation Iraqi Freedom (OIF) resulted from synergy between the Services. The same concept holds true within our Navy. We seek the fullest integration of networks, sensors, weapons, and platforms. Toward that end, we are developing the next generation of surface combatants as "sea frames"—analogous to "air frames"—as part of a modular system. Growing research and development investments over the past few years directly support increased production of the right ships for the future in the years ahead (Figure 6).

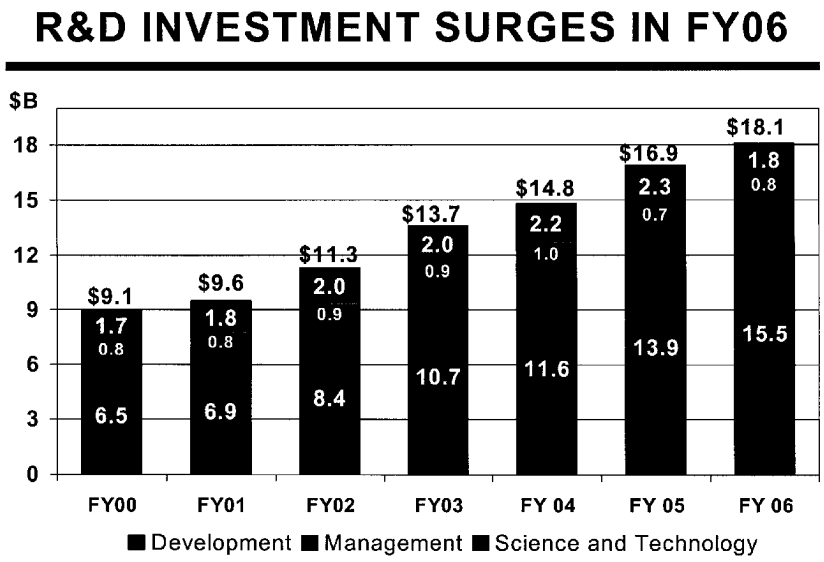


Figure 6

III. ENHANCING NATIONAL SHIPBUILDING

The state of shipbuilding in the United States is a matter of national security and worthy of priority on the national agenda. Although there is no stand-alone solution to this challenge, we can enhance efficiency by changing shipbuilding policies. A national dialogue is critical, and I will work with the Department of Defense and the administration to consider changes to these policies for the fiscal year 2007 budget and beyond.

Although not current policy, I personally recommend modifying our practice of fully funding most ships in a single year. The current policy results in funding peaks and valleys that induce uncertainty for shipbuilders. To compensate, industry retains excess capacity, increasing costs to the Navy while trying to figure out what we will do. We will avoid this problem and produce ships more efficiently if we provide a disciplined level funding approach for shipbuilding over a period of years coupled with a set of acquisition rules, developed in partnership with industry, which optimize effectiveness and efficiency. Figure 7 shows a notional level loaded investment structure to achieve a 260 ship Navy using level funding for each year. I would personally recommend to the Department and the administration that we adopt this level-funding approach for the fiscal year 2007 budget and beyond.

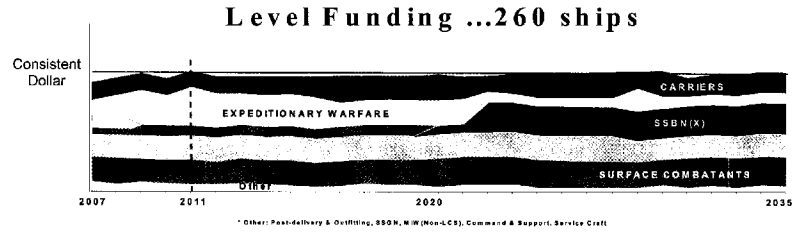


Figure 7

I also personally recommend use of research and development funds for building the lead ships of new classes. Advance procurement, split funding, and multi-year acquisition programs round out the authorizations we need to efficiently execute a disciplined national shipbuilding plan in fiscal year 2007 and beyond.

IV. CONCLUSION

To make the best shipbuilding investments, more flexible acquisition policies are needed, to help us deliver the Navy we need in the future.

Thank you for this opportunity to address my personal concerns regarding our national shipbuilding program. Thank you also for your strong and enduring support of the men and women serving our Nation in the United States Navy. They are deserving of our very best efforts to build a Navy that will remain the world's finest.

Senator TALENT. Senator Collins, why don't you finish.

Senator COLLINS. Go right ahead.

Senator TALENT. I am going to be here until the end anyway. Seriously, go ahead.

Senator COLLINS. Admiral Clark, the second issue that I want to raise with you today is the acquisition strategy. Now, I realize that it is the Navy's acquisition executive and the Pentagon's executive that will ultimately be making the decisions on this, although I think recent events suggest that Congress is going to have considerable input as well.

But what I want to ask you is for your professional judgment. In general, we have seen the Navy in the past promote more competition. For example, in 2001 General Dynamics was blocked by the Navy and the Justice Department from purchasing Newport News because the acquisition would have ended competition in the nuclear submarine construction sector. In looking back at that example, there are just numerous statements by Defense Department and Justice Department officials saying, such as we really had to maintain competition, we could not afford to let a yard go to what would end up being a sole source for us for submarines.

In your judgment, is the Navy going to be at risk if we end up with only one yard capable of constructing surface combatants?

Admiral CLARK. Senator, my view is we are at risk now. That is my view. I drive you to page 6 and the chart. We are at risk because we are not producing the product that we need and we are at risk because look at the investment scheme. This is the one I said over a 15-year period we spent $6.6 billion a year. There are the numbers. If that is the way we are going to do it, I believe that we are more at risk about failing to take action to reduce the cost of ships than we are at maintaining too much structure, because at that number the studies prove that we have more capacity than we can use now.

This is why I believe that this kind of hearing has to be held. The question about the nuclear industry goes like this. In the shipbuilding world they want and need long-term stability. They need this. In the design area, they need to be designing new platforms. We are at a watershed period in our history. Everything out there is new. By the way, there is more turmoil when you are creating the future than when you are just floating along and doing the status quo, and we certainly have been working at creating a new future.

So on the one hand, we need stability, and on the other hand we need new designs to keep unique capabilities that we alone have in the whole world. The ability to put out nuclear submarines and

nuclear aircraft carriers, that is a capability that is truly unique in the world.

So the way I see this, I do not think we really have competition today. I think we have apportionment. I think all of the numbers are now clear that it is costing us—that apportionment is costing us money. The numbers show that it will in the future.

See, I am torn, Senator. I believe in the theoretical competition in the marketplace and I am also struck with the realities that I have a 15-year history of the kind of investments where my shipbuilding numbers are going.

Senator COLLINS. One final comment or question to you. Do you believe that the competition in the design of the DD(X) produced more innovation than otherwise would have occurred if you had had only one team working on the design?

Admiral CLARK. Well, I certainly believe that it was a stroke of genius to put together the teams that created the future in DD(X). By the way, it really then gets to the issue of what the investments have been in shipbuilding. If you look over time, as opposed to some of the other segments of the defense industry, we have not invested that much in research and development. One of the realities—now we are into confronting reality—we have invested billions of dollars in research and development and I am proud of that, this budget that is. You have twice as much R&D in it as when I got to be the CNO. I am really proud of that.

I am convinced that produced a fantastic potential ship. I believe DD(X) will change the nature of it forever, and in closed hearings I can talk about things it will do that in open hearings I just do not want to talk about. So very obviously, that design conception process, we were served well.

Senator COLLINS. Thank you, Mr. Chairman.

Senator TALENT. Thank you, Senator Collins.

We have been a little topsy-turvy, Admiral, so I was not able to say that—to recognize that this is almost certainly going to be your last appearance before this subcommittee.

Admiral CLARK. You are exactly right. To the best of my knowledge, Mr. Chairman, this is my last hearing.

Senator TALENT. I imagine you view that in rather a mixed way, probably.

Admiral CLARK. I meant it when I said it is a privilege to be here. I really do mean that.

Senator TALENT. It has been a privilege to have you before the subcommittee. I want to personally and on behalf of all the members of the subcommittee and the committee thank you for your service to the Navy. You have been a tireless advocate for the Navy, for your Sea Power 21 vision. You have had a tremendous emphasis on readiness and on people. I think the morale in the Navy is as high as I have ever seen it. You have done a superb job of changing the culture of your Service to meet the future, while making people like it. It is tremendous what you have accomplished.

We all care so deeply about these issues and we respect your expertise so much, we just jump into all these questions. But I wanted to recognize your service. Thank you.

Admiral CLARK. Thank you. You are very generous in your comments and I appreciate it.

Senator TALENT. Now, I came in in the middle of Senator Collins' questions regarding flexible funding mechanisms. I want to make certain I understand what mechanisms you would recommend. Do they vary by size and class of ships? I am very attracted to the idea of flexible funding, and I think we have been tardy here in authorizing that. I think there is a general agreement, at least within the authorizing committee, on that. There is certainly a lot of support for it here.

But it begins to break down when you get into details about what you should use, and just for the big ships and just for the years when you are not buying as many, and what you should not use. That makes it difficult if we do not have a united front when we then go over to the appropriators and others who have more concerns and try and push this change upon them.

So if you would take a minute and say what—and if you have done this with Senator Collins initially before I was here, I am sorry.

Admiral CLARK. There is more to be said.

Senator TALENT. Yes. What mechanisms would you recommend? Do they vary by size, by class of ship? Tell me what you think?

Admiral CLARK. Well, if you go to page 11, to live inside the architecture that I have presented here you are going to have to be way more liberal in the development of mechanisms than we are today. So that means the very first thing that has to go is you pay for a ship in 1 year. That has to go.

Let me give you an example. In the 2005 program, we were in R&D coming into the 2005 program. I had the ship in R&D in the previous years, speaking of stability. That is where it was. The language in the mark told us exactly what we had to do. We had to abide by research and development guidelines and milestones. We did that.

When we got to the point of passing the bill in 2005, the decision was made that we could not build this ship in an R&D way. If I had been allowed to do so, I guarantee you we would have not only done it in 2005, we would have been fine again in 2006. I have $730 million or $740 million against that ship in the 2006 line.

Now, when you look at and you examine the realities, the realities are whatever that number is, 15 percent or so is going to be spent in the first year. I had way more money than I needed in that to build it in 2006, but I cannot even build it in 2006. We turned to whoever is going to build it and say, Okay, do anything you want to do, but do not dare touch your hands to a piece of steel. So right away we are telling them, do not get too fast here, go slower because you cannot go fast enough that you could even start building this. This just does not make sense any more.

Senator TALENT. So you like incremental funding?

Admiral CLARK. Incremental funding.

Senator TALENT. Without regard to the size of the ship?

Admiral CLARK. My view is that we should do it without regard to the size of the ship, and here is the reason. I believe that you have to set up some controls in the way to manage it. But if you look at my chart on page 11, figure 7, you have to give us enough

flexibility to manage within this construct. The current system does not do that.

So you could decide that you are going to use a split funding approach and you could do this by size. You could say, Okay, I will give you 5 years on a carrier and 3 years or 4 years on a submarine. You could draw up some numbers. By the way, if you did that, I would be a lot better off than I am today.

But my real view is you should want me to be as efficient and effective as I can be. To do that, that means you have to give me freedom to manage. Then you should encourage multi-years. We should also figure out how for everybody in the partnership to really like success in the multi-year construct. We should figure out then what we are going to be able to do if one of these guys is building a ship and it costs $2 billion. They figure out in the course of this that they save $100 million. By the way, that is not beyond the realm of possibility. What could we do with that today?

Under the current construct I could not do anything with it. I would have to come back and I would have to get a new set of authorizations. But if I had freedom to manage, it might be just the right window to optimize the exposure and the capacity in the shipyard to move on to another platform and get going in a multi-year kind of a concept.

I believe that if we are really going to fix this and we look at the seriousness of this, that we have to be much more liberal in our thinking. Frankly, this is what we call transformation. It starts with challenging our assumptions. What are our assumptions about the way this business will best operate?

Senator TALENT. Now, explain again—and you touched on this—the concerns you had about the amendment that we were going to offer to the budget resolution this year, which would have authorized advance appropriations? I think you said that it would have—well, explain again what your concerns were?

Admiral CLARK. I do not have the chart, but draw yourself a little bell-shaped curve, and you start in the first year and 15 percent of the total amount of the money goes in the first year, and 24 percent goes in year two, and it peaks out and then it starts, figure out that kind of a curve. What I have said, do not subject me to a windfall profit tax that says, Okay, it is only 15 percent the first year, I will take a billion dollars and I can start six ships this year, because by the fourth year I am going to be in chapter 11. That is my point.

My point was, do not do that to me without the discipline that goes with the rest of this system. In other words, that is a little too easy, and I cannot live with the third and the fourth year. That is my problem with it. I have to have a package.

Senator TALENT. The language we were offering did not contain enough discipline with it in the out years?

Admiral CLARK. It did not give me level funding. It did not give me freedom to manage. It did not give me other things that we are going to need to operate in and manage within some fixed line.

Senator TALENT. So what I hear you saying is that incremental funding is a good idea if the Navy—if you get the other things that go with it, the freedom to manage, et cetera. Without it, we could

be in a situation where we hit the wall in a few years. So it has to be a whole kind of package?

Admiral CLARK. Yes, sir.

Senator TALENT. It is not just throwing in some incremental funding and that is going to fix everything?

Admiral CLARK. That is my view. Now, let me say that 3-plus years ago I did a war game and I included and asked the shipyards to participate with us. What we found is that—and this was sitting down at the table and doing the tabletop wargame with them—the biggest advantage—the finding was that you would produce at least 15 percent more product for the same investment.

The biggest advantage was coming from multi-year contracts. But it was difficult for them, without specifying specific levels, to say how much more do you get from the second and third order supply chain and those kinds of issues. But when they get up here to talk, I know they are going to talk about the same points that you made about the importance of stability. So that stability, that discipline of a stable investment approach is the centerpiece of this.

Senator TALENT. Sure. The comments that I made, we bear our full share of the responsibility on this end of Pennsylvania Avenue, so I am not trying to avoid it. Just, we all know something needs to be done. When we get into the details of what needs to be done, we face difficult decisions technically and in some cases from a resources point of view, and it has been hard to make the decisions.

I am not going to ask you about China. There is really not a lot you could say in an open hearing. But it is very clear and I mentioned the newspaper stories in addition to the responsibilities the Navy is carrying today, we are faced with the potential of a peer competitor and maybe in a shorter time frame than we had anticipated before. This is a whole other set of responsibilities, so we need to get this resolved.

If you could pick a number for level funding for shipbuilding and conversion, what would the number be?

Admiral CLARK. Well, 5 years ago I said $12 billion. My research so far—and it is not finite yet, and let me make sure that that is clear. But where I have given you the capability curves from 260 to 325, my understanding is it is going to take close to $12 billion in the long term to produce that 260 number. If you want more than that—and by the way, that number is a 10-carrier force. But that is an attempt to use the best information that we have and examine reality.

So obviously there are trades that can be made inside that projection that was given to you about a potential force structure. With necessity being the mother of invention, you can see why I started pushing on Sea Swap. You can see why I did that. I did that out of necessity, and it is my view that we will produce a DD(X), a littoral combat ship (LCS), as Sea-Swappable platforms because we will get more return on investment for those platforms when we do it that way.

I understand that there are concerns that people have about that. I am happy to weigh their concerns against my concerns and the ability for me to meet the needs of the Nation.

Senator TALENT. What level funding do you say in your gut would produce the 260-ship Navy?

Admiral CLARK. Inside that circle of expectation, and that is Sea-Swapping these new platforms and the combatants, smaller combatants, I believe that you are looking at between $10 billion and $12 billion a year.

Senator TALENT. $10 billion to $12 billion produces the 260?

Admiral CLARK. Yes, sir.

Senator TALENT. Does that assume that we give you the ability, give the Navy the ability——

Admiral CLARK. Give us the freedom to manage and new mechanisms.

Senator TALENT. That includes LCS at what level?

Admiral CLARK. Yes, it does. I have to go back and look at that particular number. It is 60 to 70, somewhere in that ballpark. We will provide it for the record, sir.

[The information referred to follows:]

The $10 billion to $12 billion funding level produces a total of 260 ships including 63 LCS-class ships by fiscal year 2035.

Senator TALENT. Now, I am going to ask you a question that, I am not trying to take you into unreal land. I was going to preface this by saying, if you were not fiscally constrained. You are always fiscally constrained.

Admiral CLARK. Sure we are. By the way, we should be. The taxpayers deserve that kind of pressure on us.

Senator TALENT. I wanted to say, because we have had a lot of conversations over the last 2 years and some of them more formal briefings than otherwise, I never want to be understood as underrating the impact for good of the internal changes you have made in the Navy. You mentioned Sea Swap. But just the whole attitude that you have managed to instill, a can-do attitude about finding extra dollars, doing things better for less, that really can work.

This is not some kind of a pretense for saying we can do more. You can do more with less up to a limit, and it is only if you have the willingness to take that challenge on. I have been so impressed talking with officers how you have instilled that in the Navy, and I think successfully.

What we are talking about is, even given that, what do we need in order to meet these requirements? I want to take you back to size and composition of the Navy. If you were not fiscally constrained as much as you are now, assuming that we had the ability to go to level funding, at levels say up to, you mentioned $12 billion, say up to $14 billion, which I am not saying we do, but assuming we did, what would you like the size of the Navy to be and maybe the composition of the Navy?

You mentioned 260 to 325. I do not want you to get into details because you would have to get into classified stuff. But what would you feel comfortable with as an American as well as the CNO in terms of the size and composition?

Admiral CLARK. Figure 5 is on page 9 and that is where I give you the 265 to 325 number. I want to make sure everybody understands what these curves are. That 325 number is my 375-ship Navy with new concepts applied to it, and that is where, I believe, I would love to be.

Now, I believe that it will take $14 billion or $15 billion over time to do that.

Senator TALENT. That was my next question.

Admiral CLARK. I believe that is not precise, but it is where we are in our analysis. It is dependent on the mix, but it is also capability curves and so that top curve is more capable than the bottom curve.

Senator TALENT. So that 325 level, you said that is your 375-ship Navy.

Admiral CLARK. That is right.

Senator TALENT. What you mean by that—tell me if this is correct—is that capabilities you have acquired since you originally gave us the 375 figure allow you to do what you thought you needed 375 ships to do with 325?

Admiral CLARK. That is exactly correct. Let me continue on the curve. The 302 number would also be the same capability, but it would mean Sea-Swapping a carrier and large deck amphibs, and can we do that? I am not ready to say that we can.

So I optimized that in the middle of the figure to think that is a reasonable thing to seek to achieve. I appreciate the question because it drives home the point. I have been talking about a Navy that was 375 capable for us to be in the places that we need to be around the world. What I am saying, on a day-to-day basis and responding to the known operational and war plans, that 325 number with fleet response plan, which is a much more ready force than we had 5 years ago, with Sea Swap, that is exactly the same capability. It is fewer ships sitting around, in airplane parlance, sitting on a ramp.

Senator TALENT. Because I take your gut, after how many years as CNO——

Admiral CLARK. Well, 5 years here pretty soon.

Senator TALENT. I will take your gut ahead of what the QDR is likely to produce at this point. So your gut is that if you could have what you wanted it would be 325, which gives us—you wanted 375.

Admiral CLARK. That is correct.

Senator TALENT. Your gut is it takes $14 billion to $15 billion in level funding, with the management changes, to get us there.

Admiral CLARK. That is correct. Well, that is because, the other slide I just showed you was—look at the past. We have 15 years of underinvestment.

Senator TALENT. Right.

Admiral CLARK. You are going to have to get through that.

Senator TALENT. Right. Oh, I understand. Listen, I understand entirely.

Thank you. Do you have another round? I hate to give him 8 minutes of free time. He has until 5:00.

Again, we want to thank you, Admiral, for your service, for your testimony, and for your candor with us. Thank you so much.

Admiral CLARK. Thank you, Mr. Chairman. Indeed, it was a privilege, and I wish you the best as a group as you take on these very important challenges.

Senator TALENT. We hope to be seeing you again, even if perhaps in another capacity. Thank you.

We will let the Admiral retire from the witness stand, and then the second panel, please. [Pause.]

I want to welcome the second panel. Since the hour is late and you gentlemen are busy, I am going to just start with Mr. Toner. Michael Toner is the Executive Vice President of Marine Systems for General Dynamics. Mr. Toner, why do you not just give us your statement.

STATEMENT OF MICHAEL W. TONER, EXECUTIVE VICE PRESIDENT—MARINE SYSTEMS, GENERAL DYNAMICS CORPORATION

Mr. TONER. Mr. Chairman and members of the committee: Thank you for requesting this hearing. I am Mike Toner, the Executive Vice President of General Dynamics Corporation Marine Systems.

As I sat and thought about this hearing, it was inconceivable to me as I entered the gates at Electric Boat in June 1965 that at some day in my career I would be representing the shipbuilders of General Dynamics and providing shipbuilding information to the Senate Seapower Subcommittee. I am honored and privileged to do so.

I have provided written testimony for the record. Prior to receiving your questions, I would like to make a short opening statement.

There are critical issues before us today regarding the health and future of the Navy's shipbuilding industrial base. I believe that the country's ability to design and build naval warships is a true national asset, a legacy capability that could be lost if it is not continually exercised and advanced with modern design and construction technology. I believe strongly that the preservation of this industrial base is essential to our National security.

Our shipbuilding industrial base produces the most advanced warships in the world. The strength of our industry lies in our people and the engineering, design, production, and ship technology they bring to bear in delivering these ships. We are an industry, however, that is dependent on Navy ship procurement plans for our business. Herein lies the risk and the fragility of our business.

Our fragility is due largely to the instability of the Navy's shipbuilding procurement plans. This situation is made worse by unprecedented low rate production levels. These factors create a business environment that undermines our ability to effectively plan work, one where minor perturbations in volume have major cost and schedule consequences.

The fiscal year 2006 Navy shipbuilding plan reflects the procurement of 49 ships over the Future Years Defense Plan (FYDP). Less than 1 year ago, this plan reflected 68 ships. The Navy's plan to increase submarine procurement to two ships per year has again been delayed, this time by 3 years, from fiscal year 2009 to fiscal year 2012. This is the twelfth change in Virginia procurement in the plan in 10 years.

The submarine industrial base is not only dealing with an issue of minimum levels of ship procurement. For the first time in over 40 years there is no new submarine design being developed. Like the production industrial base, the submarine engineering and design industrial base is a highly specialized and unique capability, with no commercial counterpart. It is a capability that takes years

to develop and must stay actively engaged in submarine design to retain its viability.

It is interesting to point out the chart that the CNO used in his testimony, figure 7, shows notionally a ballistic missile submarine-X (SSBN–X) delivery in 2020. That says in the standard design criteria 12 years prior to the start of that design—prior to the delivery of the ship, you would have to start the design. That says in 2008 we would have to start the design of the SSBN–X, given the standard protocol of design.

The fiscal year 2006 and association FYDP does not have any money associated with the design of a submarine to start in the total period of the FYDP. That leads us to say, where is this SSBN–X going to come from and who is going to design it, who is going to be there to design it, since we have not started a new design in over—for the first time in 40 years, we do not have one on the board.

The President's budget (PB) for fiscal year 2006 further diminishes the surface combatant build rate. In PB 2005, 12 DD(X)s were planned over the duration of the FYDP. Just 1 year later in PB 2006, the total is reduced to only five ships over the same time span.

The DD–21/DD(X) program was structured from the outset to incorporate the integrated and cooperative efforts of two U.S. surface combatant shipyards across all program phases, from functional design to detailed design and ship construction. The underlying business premise has been that the ship construction program will be shared equally by two shipyards. This integrated approach, applied consistently since 1998, was designed to ensure that the DD(X) is the beneficiary of the best ideas, cumulative lessons learned, and the most innovative manufacturing processes the U.S. industry has to offer.

Given this consistent emphasis on process integration and open cooperation, General Dynamics finds the government's recent announcement of a winner-take-all competition at this late stage in the program, after over 7 years of development, to be confusing, contradictory, and very disturbing. This situation is a troubling reminder of the Seawolf submarine program rescission more than a decade ago, a single program decision whose consequences have had significant and lasting impact on the submarine industrial base.

Just as the Seawolf decision was a watershed event for the submarine industrial base, a misguided DD(X) decision will undoubtedly impact the surface combatant industrial base in ways not envisioned today. The end result will be a diminished shipbuilding capacity, suppliers exiting the defense businesses, and a higher end unit cost per ship.

In the face of the Seawolf rescission, General Dynamics Electric Boat responded with an aggressive company-wide business reengineering that has kept Electric Boat financially viable, and competitive, while sustaining their key capabilities. Today we are taking these same steps at Bath Iron Works and National Steel and Shipbuilding Company (NASSCO).

As we have shown in the past, our shipyards have adapted to the marketplace by right-sizing our organizations to meet market de-

mands. But today is different. Today the long-term implications of further industry contraction could seriously harm the National security as the U.S. addresses future threats. The issue for you, today's political leadership, is whether you are comfortable with the state of the shipbuilding industry from a national security perspective and, if not, how to reshape the industrial base in a prudent manner that will provide industry, the Navy, and the country with financially healthy, technologically innovative, and affordable shipyards.

It is unlikely that the Navy's procurement plans will return to the high volume levels maintained in the Cold War. Given the likelihood of limited production, steps can be taken to help reduce the cost of naval warships. These are five I would consider:

One: stability and predictability—you hear it again—are fundamental to the functioning of any successful business. Shipbuilding is no exception. Absent a stable and predictable plan, the industrial base cannot fully leverage its capabilities and competencies to provide the Navy with the most affordable ships possible.

Stability is also impacted by the number of lead ships today under construction in the industry. A lead ship is a first of a class ship. If you just step back and think about it, at the end of 2004 we delivered attack submarine-774 (SSN–774) and the SSN–23, both lead ships. In construction today we have SSN–775 at Newport News, amphibious transport dock-17 (LPD–17), the auxiliary cargo and ammunition ship (T–AKE), and LCS–1. On the drawing board we have carrier vessel nuclear-21 (CVN–21), DD(X), LCS–2. This is a level of lead ship activity which by its nature is somewhat unstable and adds into the stability factor that we deal with on a day-to-day basis.

Two: alternative financing approaches may give the Navy enough budgetary flexibility to sustain their procurement strategy and support their national defense obligations. The appropriate financing approach will likely vary from program to program, but advance appropriations, multi-year procurements, incremental procurements, split funding, lead ship R&D procurements all potentially offer budget flexibility to the Navy. Most importantly, while alternative financing may not provide more ships, it will provide an added level of stability that is critical to the industrial base.

Three: an alternative to the winner take all acquisition strategy for the DD(X). Since it is a cost-driven decision, we should determine what is driving the program cost and how might that cost be reduced. The DD(X) operational requirements drive an unprecedented number of new technologies brought to bear simultaneously on the first ship. From a practical standpoint, this increases program risk and cost dramatically over an approach that introduces technology through a spiral development over the first five ships in the FYDP. A spiral development approach also allows for analysis of viable less risky and lower cost alternatives.

Four: in a low-rate production environment, maintenance and modernization work takes on a more important role in preserving our production capabilities. We need to look closely at our policies and plans for accomplishing this work. By performing more of this work at ship construction yards, we will strengthen these yards by

sustaining critical shipbuilding skills and capabilities. In addition, we will reduce the cost of new construction by utilizing existing capacity and facilities and spreading overhead costs.

Finally, we need to discuss the ideas to revitalize commercial shipbuilding in the United States. We need a U.S. merchant marine built and manned by Americans. We need to define ship types necessary to supplement our national defense needs. We need to explore with Congress the universe of market incentives necessary to encourage the private sector to build and operate ships for our use.

The goal of General Dynamics Marine Systems is to be the best at what we do, whether it be building surface combatants, naval auxiliaries, or commercial ships. Toward this end, the General Dynamics management team remains focused on defining and operating sophisticated specialized facilities that have been properly sized for the prevailing customer-defined ship production rate. Unanticipated changes in volume have a significant impact on the cost of an hour's worth of labor. What we in industry need most is market predictability and an opportunity for a reasonable rate of return on our investments.

When such conditions are not met, businesses close. Once a major naval shipyard closes, it never successfully reopens. Once the skilled workforce is lost, reconstitution of a national treasure becomes too costly and becomes nonfeasible.

That concludes my comments. I would be happy to take any questions that you may have.

[The prepared statement of Mr. Toner follows:]

PREPARED STATEMENT BY MICHAEL W. TONER

OPENING REMARKS

Mr. Chairman and members of the committee, thank you for requesting this hearing. I am Mike Toner, Executive Vice President of General Dynamics Corporation Marine Systems. It is a true privilege to be here today, representing the shipbuilders of General Dynamics Marine Systems.

I want to speak with you today not only as an industry executive, but also in the role that I am particularly comfortable with—and that I am most proud of—an American shipbuilder. I know this business, and I know it well. I know what it takes to be successful, and I know how fragile success can be. There are critical issues before us today regarding the health and future of the Navy's shipbuilding industrial base. I hope that my 40 years experience as a shipbuilder will help bring a better understanding of the issues that will impact our Nation's continued ability to design and build both commercial and naval warships. This ability is a true national asset, a legacy capability that could be lost if it is not continually exercised and advanced with modern design and construction technology.

Over the last 14 years, three of my predecessors at General Dynamics have spoken to Congress on shipbuilding issues. My message today is not very different than it was when they spoke. Our U.S. shipbuilding industrial base produces the most advanced warships in the world, and preservation of this industrial base is essential to our national security. The strength of our industry lies in our people, and the engineering, design, production, and ship technology that they bring to bear in delivering these warships. We are however, an industry that is dependent on U.S. Navy ship procurement plans for our business. Herein lays the risk and fragility of our business. Our fragility is the result of low-rate production levels such that minor perturbations in volume have major cost and schedule consequences. It is exacerbated by the uncertainty in our business forecasts caused by continual revisions to the Navy's shipbuilding plans. These factors have a ripple effect on our unique supplier base which in turn further complicates our ability to ensure timely deliveries at contracted price levels.

In the face of these market conditions, General Dynamics' shipyards have continued to look for ways to reduce the costs of our products while ensuring schedule and

quality commitments are achieved as well. We have undertaken difficult reengineering initiatives to adjust to the unprecedented low-rate production of submarines and surface warships, consolidated operations and facilities, and aggressively attacked overhead costs. At the same time, we have made investments in design tools and systems, and production tools and facilities, with the goal of improving the quality and reducing the cost of our products. We have done what we could to keep this industry strong. What we cannot do, and what we look to Congress and the Navy for, is to provide program and funding stability. Stability means predictability, and predictability is fundamental to the performance of any successful business. Shipbuilding is certainly no exception. Stability will allow us to more effectively drive out costs by enabling steady, reliable production plans; by allowing suppliers to more effectively plan component manufacturing; and by providing us all—shipbuilders and suppliers—with the confidence to make prudent investments that will improve our efficiency.

We also need Congress and the Navy to continue to explore alternative financing approaches for ship acquisition. Alternative financing approaches may give the Navy budgetary flexibility to sustain their procurement strategy and support their national defense obligations, but the appropriate financing approach will likely vary from program to program. Advance appropriations, multi-year procurements, incremental procurement, split funding and lead-ship research and development (R&D) procurements all potentially offer budget flexibility to the Navy. Most importantly, while alternative financing will not provide more ships, it will provide an added level of stability that is so critical to the industrial base.

Finally, so much of the discussions today are in the context of the Navy's shipbuilding industrial base. Unfortunately, we have lost sight of just how important commercial shipbuilding could be to the strengthening of that industrial base. Today, commercial shipbuilding is a small part of General Dynamics' marine business; it is a much smaller part of this Nation's participation in the world market. The U.S. Navy has a vested interest in the revitalization of commercial shipbuilding in America. Congress and the Navy must not confine their thinking to new ways of financing how we buy warships. We need to find new ideas of how shipbuilding, not just naval shipbuilding, can be revitalized in the U.S.

Within the context of the above, I'd like to discuss my three shipyards and their business conditions.

ELECTRIC BOAT

Submarines

There are over 12,000 engineers, designers, and craftsmen at Electric Boat. They build the most complex system in the world today—the nuclear submarine. The U.S. Navy nuclear submarine of today provides a set of capabilities unmatched by any other military platform. That complexity is embodied by five critical characteristics:

Nuclear Power

For perspective on the extent to which we build safety into the nuclear propulsion plants, deployed submarine sailors—who sleep, eat, and work within yards of the reactor, whose fresh water and fresh air are made with energy from the reactor—receive less total radiation exposure each year than the average U.S. citizen gets from natural background sources.

Quieting

Today's *Virginia*-class submarine at full speed is, in fact, generally quieter than the background ocean. Our submarines are about 300 times quieter than a commercial cruise liner.

Shock

The nuclear submarine has much in common with the space shuttle, both send people and technologically sophisticated vessels into an unforgiving environment. A nuclear submarine is also designed to go into combat. Not only must the submarine be able to operate flawlessly within the ocean depths; the ship must also be able to withstand the rigors imposed in an underwater combat shock environment.

Design Tolerances

Because of the density of submarine equipment and components, and critical alignment of that equipment, nuclear submarine construction must be done to exacting tolerances. Critical equipment must continue to operate even when the "as built" construction tolerances are further challenged when the ship goes deeper and the external pressure from the sea causes critical alignments to change as operating conditions change.

Subsafe

One of the most tragic lessons we have learned in the submarine industry was the loss of the U.S.S *Thresher* in 1963. As a result of that casualty, the Subsafe program was established to provide assurance that materials and processes used in critical applications were of the highest quality and can withstand the enormous pressures of deep submergence. Over 12,000 pieces of material and over 10,000 welds are Subsafe certified on each nuclear submarine. The recent incident with the U.S.S *San Francisco* is truly a testament to the value of our Quality program. In light of the death and injuries, it is easy to overlook the fact that the quality of design and workmanship allowed the ship to not only survive, but also to return to port under its own power.

Programs

Virginia

The *Virginia*-class submarine was designed by Electric Boat Corporation. It is the latest class of advanced capability fast attack submarines to be designed and delivered to the United States Navy. From its inception, the challenge of the *Virginia* Program was to find the optimum balance between capability and affordability.

The *Virginia*-class has been designed with reconfigurable spaces and features that make it adaptable and responsive to the changing and evolving threat. The *Virginia* is the first naval combatant to be designed to meet the post-Cold War challenges of a new, uncertain threat environment—those conflicts in the near shore littoral environment. It supports seven critical post-Cold War missions: covert intelligence, surveillance and reconnaissance (ISR); anti-submarine warfare; special forces warfare; precision strike warfare; anti-surface ship warfare; mine warfare; and provides support for joint forces.

The Design/Build (Integrated Product and Process Development) contract was the first of its type for a Department of Defense (DOD) Cat 1 acquisition program. At the time of the contract award in January 1996, Electric Boat, with no precedent to follow, worked hand-in-hand with the Navy and led the development of new tools, processes and procedures, and trained shipyard workforce and oversight organizations to promulgate the required cultural change in the entire submarine enterprise. *Virginia* literally has raised the performance bar for submarine technology and shipbuilding management and is providing the model for shipbuilding of the future. One indication of our success was when we received the Pentagon's David Packard Award for acquisition excellence. It was the first U.S. Navy warship to be designed using advanced computer-aided design and visualization technology that supports integrated design and manufacturing from a single product model database.

Each ship of the class is being constructed by both General Dynamics Electric Boat in Groton, Connecticut and Quonset Point, Rhode Island, and by Northrop Grumman Newport News in Newport News, Virginia. Construction is being accomplished under a unique co-production teaming agreement whereby the construction of the ship's 18 major modules has been assigned to respective yards and the delivery of each ship is alternated between each yard. Today, the class design is complete and the program is in low-rate production at one ship per year. Electric Boat is the prime contractor for the entire construction program.

The program has experienced cost overruns. However, it is important to view these overruns within the dynamics of an uncertain, low-rate production market environment; and to look at the specific causes of these overruns. In 2001, the Navy reported an initial budget shortfall of $1.234 billion. This shortfall was driven by understated government inflation estimates, the impact of low-rate production on shipbuilders and suppliers, and ship requirements growth. More recently, an additional $419 million shortfall was driven primarily by complex new lead ship challenges and the reestablishment of dual sources for submarine construction.

On October 12, 2004, Electric Boat (EB) delivered the lead ship, U.S.S *Virginia* (SSN774), just 3½ months from a contract delivery date established over 10 years earlier. The lead *Virginia*, SSN774 was the first EB submarine delivery in 6 years—and the first lead ship in 7 years. The second ship, SSN775, will be the first Northrop Grumman Newport News (NGNN) submarine delivery in 8 years—and the first lead ship delivered by them in 28 years.

Seawolf

The *Seawolf* Program was designed to counter high performance Soviet submarines at the end of the Cold War. The need for a large number of *Seawolf*-class submarines was obviated by the collapse of the Soviet Union in 1989. Initially planned to be a 30-ship class, the program was reduced to three ships. The U.S.S *Jimmy Carter* (SSN23) is the third and final *Seawolf*-class submarine. Following closely on the heels of the delivery of the U.S.S *Virginia*, U.S.S *Jimmy Carter* was

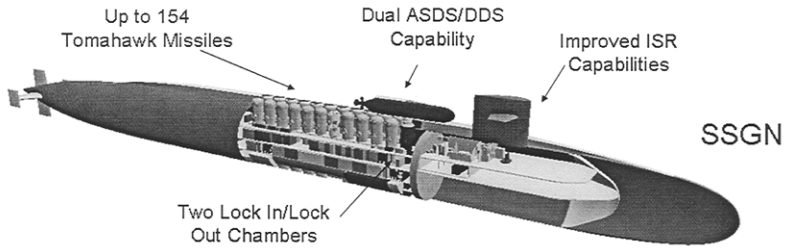
delivered to the U.S. Navy on December 22, 2004. This marked the second delivery by Electric Boat in 4 months.

Differentiating the SSN23 from all other submarines is its Multi-Mission Platform (MMP), which includes a 100-foot, 2,500-ton hull section that enhances payload capacity, enabling the ship to accommodate the advanced technology required to develop, test and deploy the next generation of weapons, sensors and undersea vehicles.

SSN23 MMP Design/Build program success has been unprecedented. Key to this success was the ability of experienced design and engineering personnel to role off of *Virginia* and immediately onto another major design program—the MMP, a project as complex as the construction of an entire *Los Angeles*-class submarine. Beginning with a notion that was little more than a Power Point slide, Electric Boat moved from concept design, to completion of detail design in 29 months—half the time historically needed to advance through this development cycle. Five months later, this unique 2,500-ton module was delivered to the Groton shipyard for assembly with the host ship.

SSGN

Electric Boat is also the prime contractor for the conversion of four Trident SSBN submarines to nuclear powered cruise missile (SSGN) configuration taking place at the Norfolk Naval Shipyard and at Puget Sound Naval Shipyard. This effort leverages Electric Boat's experience as the designer and sole builder of Trident SSBN submarines. Trident SSGN conversion will provide key capabilities for covert strike and clandestine Special Operations Force (SOF) missions.



The SSGN will provide up to 154 Vertical Launch Weapons from missile tubes previously housing ballistic missiles. Additionally, the SSGN will include an enhanced *Virginia*-class communications suite and a dedicated command and control space for better mission planning. The platform will also be modified to host two Special Operating Forces lockout chambers using dual Dry Deck Shelters and/or Advanced SEAL Delivery Vehicles. The reconfigured ship will be able to house 66 SOF personnel and provide a dedicated SOF command and control planning center. SSGN will also function as an experimental test bed to develop innovative operations concepts and payload/sensor alternatives for incorporation on future submarines. The large missile tubes inherent on this platform provide the volume to demonstrate and deploy non-traditional submarine payloads in an operational environment. The use of SSGN as a test bed for future capability to be included in future undersea systems forms the foundation for the transformation of the submarine force into the future.

Life Cycle Support, Maintenance and Modernization

Electric Boat provides centralized life-cycle support for U.S. Navy submarines and submersibles via an experienced design, construction and fleet support organization supporting all classes of submarines. Electric Boat provides onsite fleet support at Kings Bay, Bangor, Norfolk, Puget Sound, Groton and Portsmouth and fly away teams at other locations as requested. Support provided includes design, engineering, planning, maintenance, material procurement, and installation services that directly support the safe and reliable operation of the U.S. submarine force.

Additionally, in 1998 EB began re-establishing itself as a major depot level submarine maintenance, modernization and repair activity. Supporting that transition has been a robust engagement with the Naval Sea Systems Command (NAVSEA), the naval shipyards, and other field activities in the various initiatives supporting the Navy's One Shipyard concept. Fundamental to this engagement is Electric Boat's commitment to align its maintenance related processes with those of the

Navy. Electric Boat is now performing depot level availabilities including Interim Dry Dockings (IDDs), Selected Restricted Availabilities (SRAs, Depot Modernization Periods (DMPs), and scheduled Pre-Inactivation Restricted Availabilities (PIRAs) of *Los Angeles*- and *Seawolf*-class submarines in its Groton shipyard.

The Navy's submarine base in Groton, CT, and Electric Boat, within short commuting distances of each other, work closely together to maintain the Navy's nuclear submarine force. This partnership is significant and can support not only scheduled routine maintenance and modernization, but also emergent or unscheduled work requiring technical expertise, depot level capabilities and a skilled resource-pool to accommodate surge requirements. The complementary SUBASE/EB relationship affords the Government savings as well as efficiency and skilled resource flexibility, creating a synergy that is critical to the Navy and national defense.

Much of the cost debate for naval ships has been focused on acquisition cost. A truer metric may in fact be total ownership, or total life cycle costs. Nuclear submarines inherently possess low total operating costs due to their minimal manning; and, they require no at-sea logistics train, no protective escorts, and little support infrastructure ashore. Today, technology advancements have led to the development of a life of the ship core, eliminating the need for major refueling overhauls on our attack submarines. On *Virginia*, crew manning for at-sea operations, one of the key drivers of program life cycle cost, has been reduced by 12 percent from 134 to 118. In fact, on the *Virginia* program, there has been a 30 percent reduction in total ownership cost from previous submarine classes.

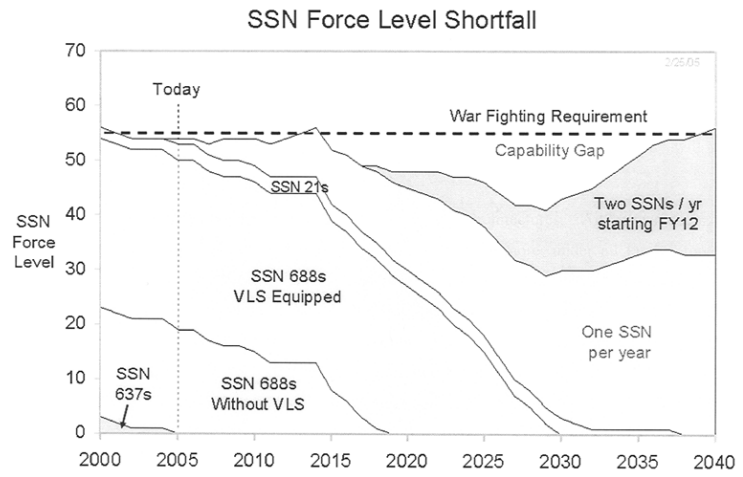
Tango Bravo

The Tango Bravo Program is a collaborative effort between the Defense Advanced Research Projects Agency (DARPA) and the United States Navy to execute a technology demonstration program to break through the "technology barriers" and enable design options for a future submarine. This effort is also aimed at decreasing platform infrastructure and the cost of the design and production of that future ship.

In October 2004, Tango Bravo proposals were sought in five technology demonstration areas: (1) shaftless propulsion, (2) external weapons stow and launch, (3) hull adaptable sonar array, (4) radical ship infrastructure reduction, and (5) reduced crew/automated attack center. Electric Boat was notified in March 2005, that they had been selected for three Tango Bravo contract awards, subject to successful negotiations. The $600 million programmed in the current Navy plan for an undersea superiority system could be used to advance these technologies and integrate them into a future *Virginia*, or to start a design effort to produce a lower cost nuclear submarine. Combined, these technologies could lead to a complete re-architect of the submarine for the first time since the Nautilus. This new architecture could remove the constraints in present submarines imposed by the shaft line and torpedo room/torpedo tubes. The initiative also could provide for the insertion of new technologies to ensure submarine relevance in the future threat environment where it will deploy.

Spiral integration of these technologies, such as external weapons, could be developed in parallel with a new forward end. Shaftless propulsion, likewise, could become a design/build effort resulting in a new stern and engine room section. By continuing *Virginia* production, ships of opportunity will provide an integrating platform.

Several studies have recently been conducted on future fleet architectures. All have recognized the enduring value of submarines for future naval operations. Furthermore, under all known force level scenarios, including the most recent Navy 30-Year Interim Report to Congress, procurement of 2 ships per year will be needed to maintain undersea superiority and replace the aging fleet of *Los Angeles*-class (SSN688-class) attack submarines as they retire over the next several decades. The 30-year report neglects to indicate a new SSBN/SSGN design will be needed in the next decade. Absent new design work, the submarine design industrial base will not be around to perform this effort.

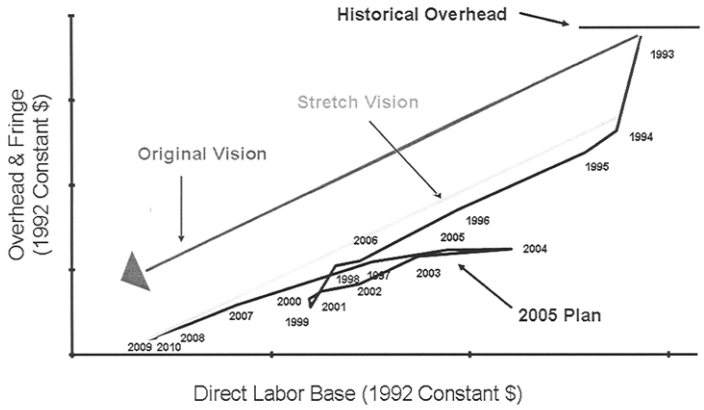


Increasing submarine procurement to 2 ships per year is required to maintain undersea superiority and replace aging Los Angeles Class submarines

Reengineered for Low Rate Production

With the abrupt rescission of the *Seawolf* program in 1991, Electric Boat was confronted with the challenge of remaining a viable enterprise in the face of a business future where its sole production program had been canceled. Electric Boat responded to this challenge with an immediate and complete reengineering of its business. This was an aggressive plan to ensure successful completion of its backlog of work while positioning the company to remain viable in what was expected to be a dramatically reduced submarine production market. Key objectives were: to be properly sized to meet demand; to utilize "best practices" for all processes and procedures; and to incorporate a culture of world-class performance. As a result, Electric Boat has led the industry in shedding excess production capacity, reducing overhead and infrastructure costs, and developing tools and methods to preserve critical skills and capabilities during low-rate production.

One of the most critical steps in the reengineering process was changing the historical relationship between overhead costs and direct labor costs. In 1992, at the outset of Electric Boat's reengineering effort, an aggressive, long range, overhead cost reduction target was established for 1998. A plan was laid out that included significant reductions in overhead cost each year. Electric Boat's realization of its goals necessitated identifying key cost areas, breaking each one down into discrete elements, and, most importantly, taking aggressive management actions to minimize these costs. These actions have resulted in actual and projected cost savings of over $2.7 billion over 1993 through 2010; $1.7 billion from 1993–2004, and $1 billion from 2005–2010. Over 95 percent of those savings have and will accrue to the Government.



Reengineering actions have resulted in actual and projected cost savings of over $2.7B from 1993 – 2010. Over 95% of these savings will go to the Government

Production and Engineering Work Force

The manufacturing, assembly, integration, and test activities carried out at Electric Boat require a highly skilled workforce with a wide variety of critical and unique skills and capabilities. Currently there are over 5,000 trades, supervision, and support personnel involved in the construction, maintenance, and modernization of U.S. naval nuclear submarines at Electric Boat.

Analysis done in support of the Office of the Deputy Under Secretary of Defense (Industrial Affairs & Installations), Study of the Submarine Industrial Base in 1997, concluded that it takes at least 2 to 3 years for a submarine shipyard mechanic to become minimally proficient and from 5 to 6 years in most trades to achieve relatively "full proficiency." In fact, it was noted that in some critical areas such as testing, where an extensive trade background is a prerequisite, it can take up to 10 years at the yard to become proficient.

The time required for the EB production workforce to become proficient is exacerbated by the uniqueness of some of the skills required to construct nuclear submarines, such as fabrication of heavy-wall pressure hull sections to demanding tolerances, lead bonding and other radiation shielding work, and stringent quality requirements for nuclear and Subsafe work. These skills and abilities must be developed inhouse, as they are unavailable elsewhere in the shipbuilding industry or from other manufacturing sectors.

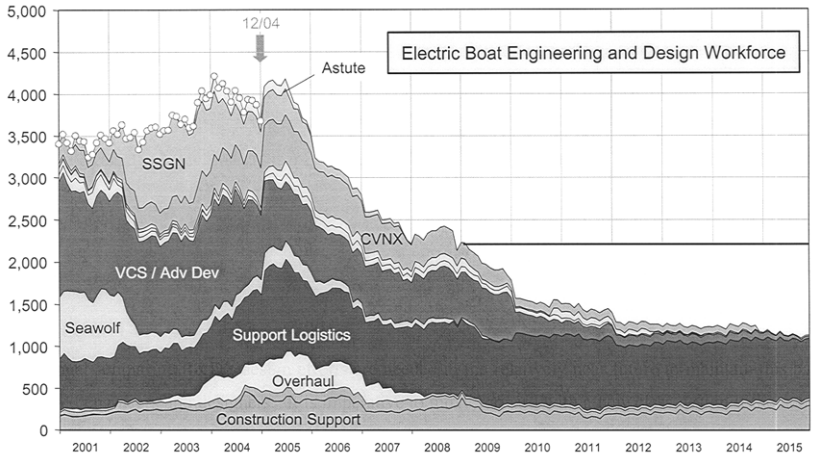
Electric Boat has identified its production workforce critical mass at approximately 3,000 production workers (1,500 in Groton Operations and 1,500 in Quonset Point Operations); it does not include production support personnel. This would be a "minimum efficient level" to sustain an efficient, affordable production trade workforce, as well as retain a balance of critical skills.

Current *Virginia* production forecast results in a workload volume that will test our ability to sustain key skills and capabilities. Absent additional new construction volume, submarine maintenance and conversion work allows us to retain an efficient trade workforce. Submarine maintenance and conversion work draws on many of the skills involved in new construction, helping to fill voids in key trades caused by the low rates of production. The added volume also helps to reduce the overall labor cost of new construction by absorbing overhead.

Electric Boat has over 3,000 engineering and design personnel engaged in all facets of submarine design and engineering. This cadre of skilled and experienced personnel represents the core of the U.S. Design Industrial Base for nuclear submarines. Like the production workforce, the engineering and design force encompasses numerous skills and abilities unique to the nuclear submarine environment. Among these unique skills are the acoustic technologies essential to stealth, advanced analytical capabilities in the areas of shock, hydrodynamics, and nuclear propulsion, and submarine systems and components integration.

The Electric Boat engineering and design workforce has not fallen below 2,500 personnel in the last 40 years. Recent studies show that at least 2,200 experienced engineers and designers will be required to retain the capability to do the next full submarine design in a timely and cost-efficient manner.

The current forecast for submarine R&D and new design development places the Electric Boat engineering and design workforce at risk. For the first time since the start of the nuclear submarine program, over 50 years ago, there is no new submarine design planned. Additional submarine R&D/design efforts are needed in the relatively near future to maintain this base of skilled engineers and designers. It is imperative to move forward with a new class design if the Nation is to retain this national security asset.



At least 2,200 experience engineers and designers will be required to retain the ability to perform the next submarine design in a timely and cost-efficient manner.

Navy Shipbuilding Plan—Submarines

Beginning with the *Seawolf* rescission in 1991, the submarine industrial base has been faced with unprecedented, protracted low-rate procurement. Although the *Seawolf* decision did not appear at the time to have national security ramifications, that was not the case. The supplier base for nuclear submarines essentially collapsed. The decision had a "chilling effect" on the industries that owned the suppliers and made them price risk into material and components, thus driving up the cost of submarines. Low-procurement rate, coupled with continued uncertainty over future program stability, has left the Nation's submarine industrial base with a dangerously limited number of suppliers. Today on the *Virginia* program, over 83 percent of the material is supplied by single or sole source suppliers. Over the last 10 years, many key suppliers of major equipment and material have left the business, resulting in the number of suppliers going from 11,000 to only 4,500 today. The results are material costs that continue to escalate at rates that place continued pressure on our ability to control unit costs.

The fiscal year 2006 Navy shipbuilding plan reflects a procurement rate of one submarine per year until fiscal year 2012. Once again we have seen the Navy's plan to increase submarine procurement to two ships per year delayed; this time by 3 years from fiscal year 2009 to fiscal year 2012. This is the 12th change to the *Virginia* procurement plan in 10 years. Over this time, the forecast for nuclear submarines has been reduced by almost 40 percent, a reduction from 24 ships to 15 over the 1998–2012 time frames. This is estimated to be a reduction of about $20 billion to our single product market.

	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	TOTAL
DEC 95	1	0	1	0	2	2	2	2	2	2	2	2	2	2	2	24
DEC 96	1	1	0	1	1	0	1	2	2	2	2	2	2	2	3	22
NOV 97	1	1	0	1	1	0	1	2	2	2	3	3	2	3	2	24
FEB 98	1	1	0	1	1	0	1	2	2	2	3	3	2	3	2	24
OCT 98	1	1	0	1	1	0	1	1	2	2	3	3	3	3	2	24
MAR 99	1	1	0	1	1	1	1	1	2	2	3	3	2	3	2	24
JUN 00	1	1	0	1	1	1	1	1	1	2	2	3	3	2	3	23
JUN 01	1	1	0	1	1	1	1	1	1	2	2	3	2	2	3	22
APR 02	1	1	0	1	1	1	1	1	1	1	2	2	2	2	3	20
MAY 03	1	1	0	1	1	1	1	1	1	2	2	2	2	2	3	21
MAR 04	1	1	0	1	1	1	1	1	1	1	1	2	2	2	2	18
JAN 05	1	1	0	1	1	1	1	1	1	1	1	1	1	1	2	15

Navy FY06 shipbuilding plan delays increase to 2 ships / year from FY09 to FY12. This is the 12th change to the VIRGINIA procurement plan in 10 years.

Despite low procurement volume and uncertainty over future plans, the shipbuilders and suppliers continue to strive to reduce the cost of nuclear submarines. Most significantly, with help from Congress, the six ship, Block II procurement of *Virginia* ships was awarded under a multi-year contract, with Economic Order Quantity and funding. This acquisition strategy will allow the shipbuilders and suppliers to achieve a significant reduction in material costs that would not have been achievable under more typical single ship contracts.

The submarine industrial base is not only dealing with the issue of a minimum level of ship procurement, but for the first time in over 40 years, there are no new submarine designs being developed. Similar to the production industrial base, the submarine engineering and design industrial base is a highly specialized, unique capability, with no commercial counterpart. It is a capability that takes years to develop and must stay actively engaged in submarine design to retain its viability.

A vivid example of the impact that procurement instability can have on a nation's shipbuilding capability can be seen in the depletion of the United Kingdom's (U.K.) submarine design and construction capability. Erosion of the U.K.'s submarine industrial base was caused by reductions in defense spending that led to an extended gap between designs and low submarine production rates. This resulted in the closure of a shipyard, major job losses, and the loss of "corporate knowledge" as experienced personnel shifted to other industries.

The U.K. has experienced significant problems in executing their new submarine design program—*Astute*—as a result of their eroded capability. With their submarine engineering and design capability effectively disbanded they must accomplish their new design using other industry engineers and designers. This approach has yielded a design that has required numerous changes and a program that is over budget and behind schedule. At the U.K.'s request the U.S. Navy has tasked Electric Boat to assist in design and management support services to meet resource shortfalls of the U.K.'s current submarine industrial base.

The rapid and costly depletion of the U.K.'s submarine design and construction capability has elements that are strikingly similar to those now faced by the United State's submarine industrial base. We could face the same dilemma as the U.K. if development funding for submarines is cut. The U.S. "corporate knowledge" base is at risk, and if reconstitution becomes necessary, there will be no comparable assistance available. Learning from the U.K.'s experience and proceeding with a submarine procurement plan that provides predictability and production rate stability is critical to our Nation's defense.

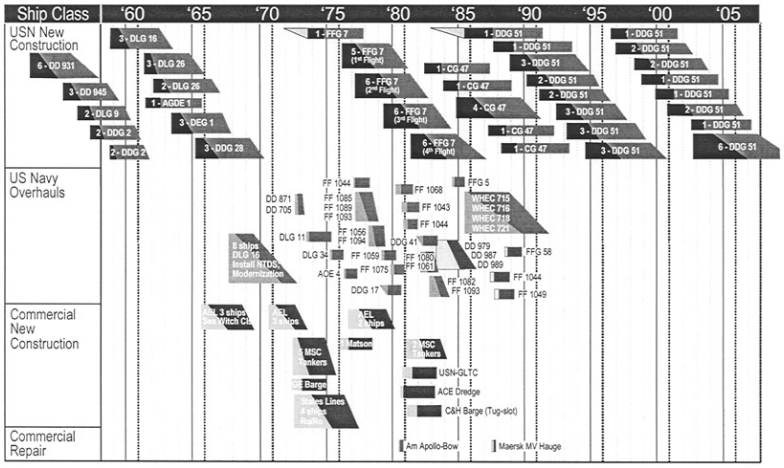
BATH IRON WORKS

Surface Combatants

The name Bath Iron Works (BIW) has been synonymous with U.S. Navy surface combatants since the closing decade of the 19th century. BIW's first U.S. Navy warship; U.S.S. *Machias* was delivered and commissioned on July 20, 1893, and since

then over 230 Bath-built ships have served America's Fleet in defense of our Nation. BIW delivered 89 ships to the U.S. Navy during WW II, averaging one destroyer every 17 days during the peak production years of 1943–1944.

Since World War II, BIW has designed and built the lead ship for 11 of the 20 new, non-nuclear surface combatant classes procured by the U.S. Navy. As the designer and lead ship builder of the DDG 51-class, BIW has been at the leading edge of the integration for Aegis and guided-missile weapons technology delivering 24 DDGs since the fall of the Berlin wall.

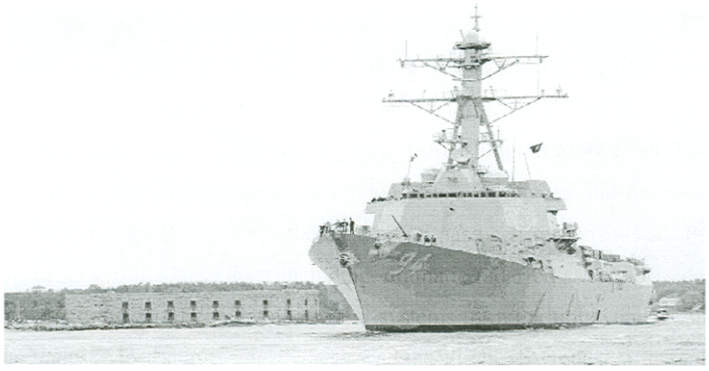


BIW will build 34 of 62 DDG 51 Class Ships before construction completes in 2010. From 1965 – 1985 commercial shipbuilding was a key component of BIW's business.

Programs

DDG 51

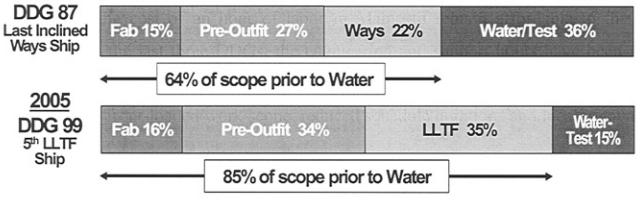
BIW is currently constructing DDG 51-class destroyers and will deliver 10 more of these ships before construction concludes with DDG 112. Ultimately, BIW will build 34 of the 62 ships in the DDG 51-class before construction completes in 2010 making the DDGs the largest post-WWII class of Navy ships. Each one of these highly complex, technological marvels is packed full of equipment and brought to life by more than 48 miles of pipe and 254 miles of cabling, roughly the distance from one end of Maine to the other, in a ship that is 50 feet shorter than the Washington Monument. Each ship is unique and more capable than its predecessor as new technologies are introduced and improvements are made. As the lead shipbuilder and design agent for the class, BIW has been responsible for the introduction of many of these innovations to the Navy fleet including, dramatic radar cross section signature reductions, shipboard integration and testing of combat and sensor systems from multiple vendors, and multiple shipwide capability upgrades. Most significant of these was the Flight IIA redesign, essentially a lead ship since more than 75 percent of the construction drawings were modified. As the planning yard for the DDG Class, BIW supported the Operational Navy after the terrorist attack on the U.S.S. *Cole* by sending engineers with wearable computers directly linked to BIW's Surface Ship Support Center to assist damage control and transport operations in Yemen within 48 hours of the attack.



First Flight IIA Ship: USS OSCAR AUSTIN DDG 79

Performance by the men and women of BIW has provided significant cost and schedule improvements over the 20-plus years of the DDG 51 Program. This sustained focus on performance improvements has allowed the cost of an hour of labor in Maine to remain affordable to the United States Navy. Broadly, over the last three DDGs, the engineering and support hours have been reduced by more than 20 percent and the manufacturing hours have been reduced by over 9 percent per ship. These improvements are attributable to front-loaded work scope, reduced schedule durations and local innovations.

Since the conversion from traditional inclined building ways to the Land Level Transfer Facility, BIW has made a concerted effort to move work scope to earlier, more efficient stages of construction where access to equipment is less congested and support services are more readily available. As shown in the bar charts below, the work to be completed during the water-borne period, which is the least efficient stage of construction, has been reduced from 36 percent to only 15 percent. Associated process improvements have enabled an 11 percent reduction in the hours required to complete the most complex outfitting aboard the ship. Further, the overall ship construction duration has been reduced by 30 percent since BIW began building ships on its Land Level Transfer Facility of which the water-borne duration has been reduced by 62 percent.

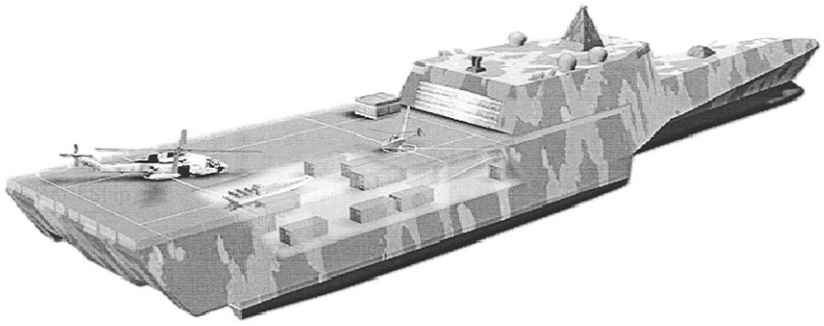


BIW Land Level Transfer Facility has allowed water-borne work – the least efficient stage of construction – to be reduced from 36% to 15% of ship construction.

In addition to planning and scheduling driven improvements, the innovative spirit of BIW's skilled mechanics and managers has generated great benefits. Some of BIW's surface combatant "firsts" include: "lighting-off" the Aegis combat system and the ship's generators before launch; aligning the main propulsion power train before it is water-borne; using photogrammetry, a technology principally developed for surveyors and cartographers, to aid in equipment and structural alignment; and DDG 94, our most recent ship, delivered after only a 1 day sea trial. BIW Land Level Transfer Facility has allowed water-borne work—the least efficient stage of construction—to be reduced from 36 percent to 15 percent of ship construction.

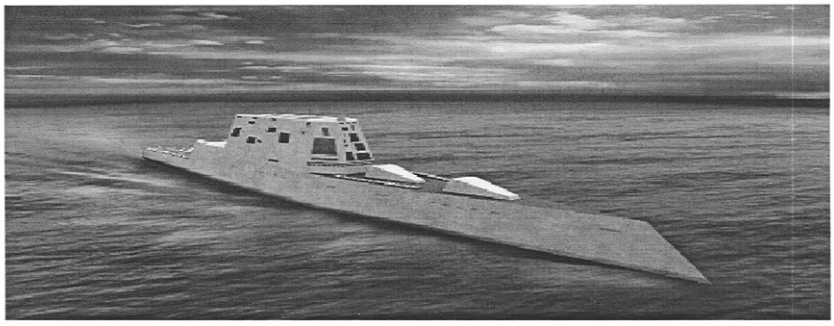
Littoral Combat Ship

In response to the Navy's evolving requirements for transformational platforms to combat emerging threats, Bath Iron Works is leading a multinational team in the Final Systems Design phase of the Littoral Combat Ship program. The General Dynamics LCS Team concept couples fully integrated open architecture information systems with an innovative high-speed trimaran hull form to deliver maximum warfighting capability. With its superior capacity to carry combat payload volume and weight, excellent seaway performance and exceptional aviation capability, the General Dynamics' LCS is a flexible, agile and lethal solution for the Navy's needs today and for the Joint Operational Concepts of tomorrow.



Conceptual View of the GD LCS

Joint Sea Basing will be a critical element of our future national defense strategy. A General Dynamics Team lead by Bath Iron Works is investigating the requirements for Sea Base implementation. In close collaboration with all military Services, we are developing a new joint force concept of operations, identifying technology development needs, and designing two concept ships. These ships, together with the high speed and versatility of the General Dynamics LCS, can meet all future Joint Sea Basing requirements and deliver a capability that is tailorable, scalable, persistent and affordable.



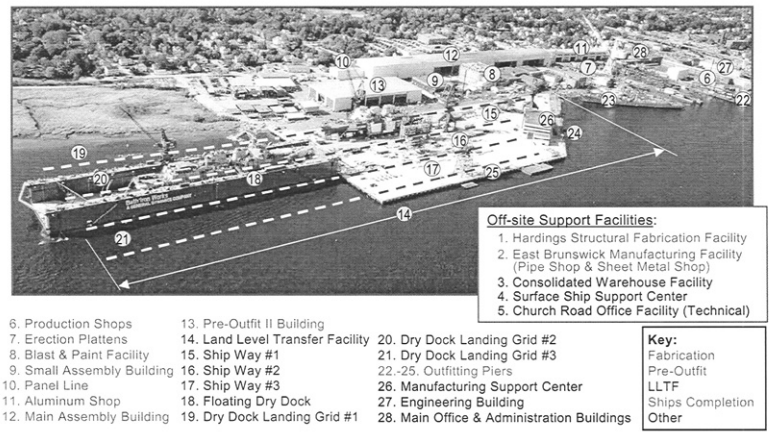
Conceptual View of the DD(X) Future Surface Combatant

Workforce and Facilities

The 6,300 employees at Bath Iron Works are skilled craftspeople producing a sophisticated, complex product in support of our U.S. Navy customer. The specialized nature of the product demands design and construction skills that are not readily

found in other industries. Shipbuilding is a labor intensive business that also necessitates significant investments in time and money to develop and maintain a proficient workforce. Each skilled shipyard mechanic requires approximately 5 years to gain full proficiency at a training cost of $50,000. Similarly, each engineer and designer requires an investment of 3 years and $60,000–$90,000. These skilled and innovative craftspeople are vital to maintaining a national shipbuilding competence.

In response to the evolving Navy priorities, programmatic instabilities, and diminished build-rates, General Dynamics has implemented aggressive business restructuring efforts to appropriately size its shipyards and gain efficiencies. In the late 1990s, General Dynamics, in cooperation with the state of Maine and the city of Bath, invested over $300 million in a state-of-the-art Land Level Transfer Facility at Bath Iron Works to radically improve the shipbuilding process. This flexible, world-class facility was sized appropriately for the Navy's PB 1999 projected surface combatant plan; and supported the Navy's stated desire to maintain two sources of supply for surface combatants.



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Navy Shipbuilding Plan—Surface Combatants

Predictability is fundamental to the functioning of any successful business; shipbuilding is no exception. Key business decisions related to facility modernizations and the retention and enrichment of critical shipbuilding skills must be made years in advance of when they are required and must be predicated on reliable workload forecasts. Absent a predictable plan, the industrial base can not fully leverage its capabilities and competencies to provide the Navy with the most affordable ships possible. Unfortunately, the desired stability has been lacking from the Navy's recent acquisition plans.

The Quadrennial Defense Review is one manner of justification for Navy ship acquisition plans. Completed in 1997, the current administration endorsed this plan by incorporating the same Fleet requirements in 2001, calling for a 300+ ship Fleet. In most basic terms, sustaining a 300-ship Navy requires building an average of 10 ships/year; however, the steady-state build-rate has been 6 or less since 1993. PB 2006 further diminishes the build-rate—in PB 2004, 12 DD(X)s were planned over the duration of the Future Years Defense Plan (FYDP), but in just 2 years this total has been reduced to only 5 ships over the same time span in the currently proposed budget.

Over the past decade, industry has invested heavily in several programs that were ultimately canceled with no chance to see a return on the investment, includ-

ing Arsenal ship, JCC(X), and the SC 21/DD 21 programs, the progenitors of the current DD(X). Similarly, General Dynamics cooperated to the maximum extent possible with the Navy-initiated LPD-DDG swap. The Corporation understood and supported the Navy's clear need to maximize the overall management, technical and financial stability of the LPD 17 Program by consolidating all private sector responsibilities under a single business entity. The survival of the program was at risk; bold actions were essential and it was implicit that the "swap" process could not—would not—balance all business/financial issues. Knowing that such inequities existed did not prevent General Dynamics from acting in the best interest of the Navy to achieve budgetary control of the LPD 17 Program. At the time, this appeared to be done to our own near-term disadvantage, albeit with assurances of longer-term stability in Navy combatant new construction programs. However, recent Navy actions/proposed actions on the DD(X) Program appear to be in direct conflict with these assurances.

Under the leadership of the U.S. Navy, the DD 21/DD(X) Programs have been structured from the outset to incorporate the integrated and cooperative efforts of the two U.S. surface combatant shipyards across all program phases, from Functional Design to Detail Design and ship construction. The underlying business premise, which has enabled a consistent focus on full cooperation, not isolated competition, has been that the ship construction program would be shared equally by the two shipyards. This integrated approach, applied consistently since 1998, was designed to ensure that the DD(X) is the beneficiary of the best ideas, cumulative lessons-learned and most innovative manufacturing practices that U.S. industry has to offer. BIW has been cooperating fully with the Navy's directions in all areas, openly sharing design expertise and manufacturing best-practices with our primary competitor, NGSS-Ingalls Shipbuilding. Given this consistent emphasis on process integration and open cooperation, General Dynamics finds the Navy's recent announcement of a winner-take-all competition at this late stage in the program, after over 7 years of development, to be confusing, contradictory and very disturbing. A dangerous parallel exists today with DD(X) and *Seawolf*. Just as the *Seawolf* decision had unforeseen national security implications, so too does the DD(X) decision.

The reasoning provided by the Navy for their unilateral proposal of a "winner take all" competition was in reducing the number of DD(X) ships to be built over the next several years, the costs of two sources of supply for these ships could no longer be justified. Since it remains the Navy's intention to buy at least 10 DD(X) warships, an alternative approach would be to ask industry the simple question: "what is driving the cost of this ship and under these circumstances what can you do to reduce the cost of the DD(X) program?"

After thinking about this I offer the following. The DD(X) operational requirements drive an unprecedented number of new technologies brought to bear simultaneously on the first ship. While the need for these advances in capability is unambiguous, from a practical standpoint both cost and risk are dramatically increased. These requirements were developed from an evolving document dating back nearly a decade. During this time the prime threat to the United States shifted from a major sea-power to an expanded list now including the war on terror and weapons of mass destruction. Clearly this ship must be capable against today's lower probability threat—an emerging sea power—but the path to meeting that threat should be considered as an evolutionary, affordable one rather than all capability on the first DD(X).

I would suggest that the five ships in the FYDP be delivered in a spiral development manner. The first ship would include those revolutionary technologies that are just too expensive to backfit or forward fit into later hulls. The tumblehome hull form, the revolutionary electric drive propulsion system, and the appropriate level of capability in the combat system are examples of things that would remain on the first and all following ships.

Some things should be rethought regarding the basic need for them when considering the threat that has evolved and viable alternatives with lower risk and cost. An example here might be to review the composite deckhouse and hanger. I would see if other material could meet all or most of the needs for the ship but reduce the manufacturing risks of this revolutionary technology—at least in modules of this magnitude. This would be a decision that would affect all or most of the ships in the DD(X) program.

Spiral development of technology and warfighting capability is a third method of attack—in this case capability that could be affordably added later. An example here is over the first five ships sequentially starting with the ASW component, add mine countermeasure capability later, and use signature reduction techniques in a spiral fashion after validating the requirement over time for this enhancement.

Today, BIW is preparing for low-rate production, by working to further reduce its overhead structures and innovatively exploiting its existing facilities. Bath Iron Works believes that it can best serve its Navy customer by remaining a modestly-sized, yet nimble shipyard that can provide a unique, highly-complex, sophisticated product while leveraging appropriate resources from across General Dynamics. In light of the near-term instability of the Navy's overall acquisition plans, it appears that the DD(X) will be a low-rate production program and BIW has factored this expectation into its ongoing efforts to rationalize design and manufacturing cost structures and facility/resource loading plans.

NASSCO

Business Overview

National Steel and Shipbuilding Company, NASSCO, in San Diego has been designing and building ships for almost 50 years, and is the only remaining private shipyard on the west coast capable of building large, ocean-going vessels. NASSCO, with its 4,200 engineers, designers, and skilled, shipbuilding craftsmen is the largest industrial manufacturer in the San Diego area and is a strategic resource to both the Navy and Southern California. NASSCO specializes in commercial cargo ships and Navy auxiliary and underway replenishment ships, as well as Navy repair and maintenance. In the last 5 years, NASSCO has completed the design of three first-of-class ships, two for U.S. commercial operators, and one for the Navy.

One quarter of NASSCO's business activity is devoted to maintenance and repair of the Navy's fleet home ported in San Diego. NASSCO, working together with the Navy has developed the most effective mode of Navy maintenance in the country. Importantly, NASSCO, with its well-developed new construction capability, is the only private shipyard on the west coast that can perform major battle damage repair or major structural modifications to Navy ships.

Programs

T–AKE

The T–AKE 1 Lewis and Clark class dry/cargo and ammunition ship is the latest in NASSCO's long line of Navy auxiliary ships. It is the first new underway replenishment ship design in more than 20 years. NASSCO has eight T–AKEs under contract with options for up to an additional four. Using computer modeling and simulation design tools and proven off-the-shelf state-of-the-art commercial marine systems, NASSCO's T–AKE design incorporates a highly-efficient cargo handling system and a low life-cycle-cost electric drive propulsion system. The first two ships are now under construction. The Lewis and Clark lead ship will launch on May 21 and will deliver in early 2006.

Commercial—TOTE

Two new commercial roll-on/roll-off (RO/RO) trailerships, which feature a diesel-electric propulsion system, were delivered to Tacoma, Washington-based Totem Enterprises in 2003 and are providing service between Alaska and the lower 48 States. These ships were designed specifically for the rigors of the Gulf of Alaska, and have received many awards for their environmental protection features.

Commercial—BP Tankers

NASSCO has built more of the country's commercial oil tankers than any other shipyard today. Currently NASSCO has a series of double-hull Suezmax crude carriers, also with diesel-electric propulsion, under construction for BP. These ships are designed with a 50-year hull life and are the most environmentally friendly tankers ever designed and built. The first two ships are already in service transporting crude oil between Valdez, Alaska, and BP's west coast refineries. The final two ships will deliver by third quarter 2006.

Underway Replenishment and Strategic Sealift

For the Navy, NASSCO is a leading builder of underway replenishment and strategic sealift ships. From the AFS combat stores ships to the AOE gas-turbine-powered carrier strike group combat support ships, from T–AKR Maritime Prepositioning to the LMSR large medium speed roll-on/roll-off sealift ships, NASSCO-built ships are an essential element of the Navy's ability to operate throughout all regions of the world, independent of shore-based support. NASSCO's considerable experience in each of the Navy's past combat logistic ship and sealift ship program design and production ideally positions NASSCO to be a principal contributor on the Navy's forthcoming Sea Basing program.

Workforce and Facilities

While NASSCO's three new ship classes were making their way through the shipyard in the last 3 years, GD made a significant investment of more than $130 million in upgrading many of NASSCO's production facilities to world class levels. Although we saw some benefit from these new facilities on the Totem Ocean Trailer Express (TOTE) and BP ships, the real beneficiary is the Navy's new, T–AKE dry cargo/ammunition ships.

Despite this sizable investment in new facilities, NASSCO's experience on its recent commercial programs has not met our expectations for improved efficiencies. There are a number of very relevant observations that I offer to this committee as a result of this experience at NASSCO that reinforce my own conclusions after 40 years in this industry:

First, an investment in shipyard shipbuilding technology and facilities does not in itself guarantee improved productivity and competitiveness. It is steady continuous volume with repeatable product designs that is the most important element for improving shipyard efficiency. We see this clearly in benchmarking our production rates and planning processes against leading commercial shipbuilders around the world, all of whom deliver between 10 and 60 ships per year. In contrast, NASSCO's all-time peak output was seven ships way back in 1971. In today's market place, we produce only two or three ships per year.

Second, production rates must be stable and predictable. When NASSCO started construction on its TOTE new buildings, its work force had by then declined from a high of 5,100 employees in 1995 to 2,800 in mid-2001 as it was winding down production on the very successful Navy sealift ship program and awaiting the T–AKE contract to be awarded. To ramp up production for the TOTE ships, NASSCO had to hire and train more than 1,000 new production employees at a significant recruitment and training cost, plus lower productivity from these inexperienced personnel.

Commercial Shipbuilding

Prior to 1981, the U.S. had a robust commercial shipbuilding industry. For the period 1976 through 1980, U.S shipyards had an average of 61 commercial ships under construction. Shipbuilding, however, has always been a global market and an intensely competitive one. It has always been an industry in which governments have actively supported their domestic industry. This was true in the U.S. as well. However, in 1981, our government made a conscious decision to stop providing the financial support necessary for U.S. shipyards to compete in the heavily subsidized international commercial shipbuilding market. The U.S. was going to set an example to the rest of the world, in the hope that other governments would also eliminate their subsidies to shipbuilding and provide a more level playing field for our shipyards.

Today, unfortunately, foreign yards are still heavily subsidized by their governments in various ways led by Japan, Korea, and most recently China. Over the last almost 25 years, U.S. foreign trade has grown to 1.2 billion metric tons a year, a 50-percent increase. Yet, we, the world's largest trading nation, now have a U.S. flag merchant marine of 234 ships carrying an anemic 2 percent of our foreign trade. More important from my perspective, very few of the U.S. flag ships operating in our foreign trade were U.S. built. In 2004, U.S. shipyards had only 7 commercial ships on order, all for the domestic coastal trade, not foreign trade, which represents a paltry 0.3 percent share of the world market.

It is not that U.S yards lack experience building commercial ships. U.S. yards have built cruise ships, LNG ships, RO/ROs, container ships, crude and product tankers, etc. In fact, five of our Nation's six largest shipyards have a heritage rich in building commercial ships. We are not in this market today because 25 years ago we lost the support of our elected officials and ceded the international commercial market to foreign shipyards. U.S. yards instead focused on building ships for the U.S. Navy which reached a high water mark of just under 600 ships in the mid-1980s. Today, the U.S. Navy fleet is less than 300 ships and headed lower.

Ship design and shipbuilding technology evolves from commercial not naval shipbuilding. For perspective, there are some 2,000 new commercial ships built in the world every year; at best there might be 100 navy ships built each year around the world.

Commercial shipbuilding brings tremendous benefits to the Navy and the Nation:

- Allows shipbuilding and ship design technology benchmarking against the best in the world; not just the best in the U.S.
- Ensures access to the best of international marine technology and competitive prices for commercial marine systems that are found aboard many Navy ships

- Commercial volume allows for the continuous process improvement in construction technique
- Preserves and enhances the employment skill level necessary to build ships
- Helps attract a necessary new generation of engineers into shipbuilding
- Spreads yard overhead costs across a wider base making Navy ships less expensive
- Fills in the valleys between Navy programs

U.S. yards are now in the unenviable situation where Navy shipbuilding has declined dramatically and we have little or no commercial business to fill the void.

Under the right circumstances, U.S. Shipbuilders can produce affordable commercial ships for the Jones Act domestic trade at a profit in this country and the Navy would be a direct beneficiary. A line of commercial ships of sufficient numbers, of a proven design, and totally repeatable from one customer to the next, could lower the overhead costs on Navy programs and provide the stable and predictable production volumes that would drive improved efficiency and continued investment. This would result in a more robust, modern, U.S. flag fleet, but, equally important, more affordable Navy ships, and a stable industrial base. The Navy will always need a balanced fleet across its multiple mission areas from submarines, to surface combatants, to auxiliary and support ships. We need to do all we can to fund and preserve an industrial base that can efficiently and cost-effectively produce ships for each mission area.

Navy Shipbuilding Plan—Naval Auxiliaries

As a final observation, I would offer that in the low-rate production environment that now characterizes U.S. shipbuilding, program sequencing is an extremely important consideration. When NASSCO designed the new TOTE ships, it had not designed a new Navy or commercial ship in over 5 years. NASSCO essentially rebuilt its engineering and design capabilities, both software and people, for the TOTE and BP commercial programs. Such gaps in new ship program starts are very expensive, create significant inefficiencies, and result in long cycle times from contract to ship delivery. I fear we will see similar discontinuities in the current Navy auxiliary ship programs as the design development gap between T-AKE and the Navy's next planned program the T–AOEX and the MPF(F) is now over 6 years with the potential to increase even more as a result of low shipbuilding budgets. I would strongly urge the Navy to fully consider program continuity and its many implications when making its programmatic decisions.

SUMMARY

State of the Industrial Base

As we have shown in the past, our shipyards can adjust to the market place by right-sizing our organizations to meet market demands. But, I believe today is different. Today, the long term implications of any further contraction of the capabilities of your major U.S. shipyards could seriously harm national security as you address our future threats. The issue for you, today's political leadership, is whether you are comfortable with the state of our shipbuilding industry from a national security perspective.

In recent testimony, the CNO has illustrated the fact that over the last 40 years, ship unit costs have grown, and in some cases have grown dramatically. It cannot be disputed that there has been cost growth in naval warships, and that industry and the Navy must be unrelenting in their efforts to reduce the cost of these ships. What cannot be overlooked are key factors beyond the shipbuilders' and industry suppliers' control that have contributed to this growth. Most specifically, today's naval warships bring tremendous advancements in capability over those of 40 years ago; advancements in weapons, in electronics, in stealth, in survivability, and in reliability and maintainability.

It is unlikely that the Navy's ship procurement plans will return to the high-volume levels maintained during the Cold War. Given the likelihood of limited production, steps must be taken to help reduce the cost of naval warships.

Predictability is fundamental to the functioning of any successful business; shipbuilding is no exception. Key business decisions related to facility modernizations and the retention and enrichment of critical shipbuilding skills must be made years in advance of when they are required and must be predicated on reliable workload forecasts to justify such expenditures. Absent a predictable plan, the industrial base can not fully leverage its capabilities and competencies to provide the Navy with the most affordable ships possible.

Alternative financing approaches may give the Navy enough budgetary flexibility to sustain their procurement strategy and support their national defense obligations. The appropriate financing approach will likely vary from program to program, but advance appropriations, multi-year procurements, incremental procurement, split funding and lead ship R&D procurements all potentially offer budget flexibility to the Navy, thereby creating the opportunity for industry to reliably predict volume, and thus provide more cost fidelity for future work. It is important to recognize, however, that this is not a panacea for the Navy. It will not buy more ships. What it will provide is an added level of stability that is so critical the industrial base.

We need to look closely at our policies and plans for accomplishing maintenance and modernization work. In a low-rate production environment this work can play a much more important role in preserving our production capabilities. By performing more of this work at the ship construction yards, we will strengthen these yards by sustaining critical shipbuilding skills and capabilities. In addition, we will reduce the cost of new construction by utilizing existing capacity and facilities; and by spreading overhead costs.

I also believe we need to discuss ideas to revitalize commercial shipbuilding in the U.S. We need a U.S. merchant marine built and manned by Americans and we need to define the ship types necessary to supplement our national defense needs. Working with Congress, we need to explore the universe of market incentives necessary to encourage the private sector to build and keep these vessels in operation.

Toward this end, Congress and industry must do a little thinking "outside of the box." For example, can shipbuilding have a role in reducing the pressures on our Nation's highway infrastructure? The amount of freight transported on our highways is staggering. Perhaps Congress, working with Government agencies, can devise appropriate legislation and incentives which would result in a more vibrant merchant marine—a fleet of commercial cargo carriers to service the domestic trade. The benefits would be tremendous. Such revitalization of commercial shipbuilding would reduce the cost of Navy platforms if for no other reason than the increased economies of scale from additional shipbuilding volume. Revitalization of commercial shipbuilding would result in development of commercial "best practices," some of which could be applied to military shipbuilding and thereby also reduce cost to DOD. Revitalization of commercial shipbuilding by such a manner would also produce a ready-reserve capability available to DOD in case of national emergency.

I mentioned Congress and DOD developing legislation and incentives to facilitate this concept. Consider that the concept outlined provides significant benefit to DOD. Why can't DOD, therefore, fund development of a non shipyard-specific design for such a cargo fleet, and then make that design available to industry for commercial exploitation? This is not so different an investment philosophy that Congress and the Navy currently provide to support the National Shipbuilding Research Program, it just adds a real tangible result to that strategy. This kind of thinking is what we need to do more of if we are truly going to strengthen our industrial base.

The Navy, in cooperation with the shipbuilding industrial base, must make use of all available technical/industrial levers to maximize the capabilities of the industrial base to provide the Fleet with the right mix of the capable, affordable ships needed to meet our national defense needs. Industry stands ready to support the Navy customer and invest in the future, but a clear, predictable plan must be defined; then the Navy-industry partnership must work to the plan.

The goal of General Dynamics Marine Systems is to be the best at what we do, whether that is submarines, surface combatants, naval auxiliaries or commercial ships. Toward this end, the General Dynamics management team remains focused on defining and operating sophisticated, specialized facilities that have been properly sized for the prevailing, customer-defined, ship production rate. The recent benchmarking study conducted by the Deputy Under Secretary of Defense for Industrial Policy confirmed that we have met that goal—facility resources, critical skills and competencies are continually being tuned to suit prevailing, as well as predicted, market demands. Unanticipated or uncontrollable changes in volume have a significant impact on the cost of an hour's worth of labor. While facilities can be readily re-tooled or taken off-line, this country's highly-skilled shipbuilders (engineers, designers and craftsmen) are a national treasure; they cannot simply be placed in "reserve" status. GD shipyards have avoided a reckless pursuit of added capacity; instead they have worked to right-size in order to be in the best position to meet the challenges of tomorrow's Navy. GD shipyards are meeting commitments and expectations. In return, we need predictability and an opportunity for a reasonable rate of return on our investments. When such conditions are not met, businesses close. Once a major naval shipbuilding yard closes it never successfully re-

opens; once the skilled workforce is lost, reconstitution of this national treasure is too costly and simply not feasible.

Senator TALENT. Thank you, Mr. Toner.

Dr. Dur, you are next and thank you for being here. I would encourage you to keep your oral statement as brief as possible, but it is an important hearing and you are kind to give us your time, so take what time you need.

STATEMENT OF PHILIP A. DUR, PH.D., PRESIDENT, NORTHROP GRUMMAN SHIP SYSTEMS

Dr. DUR. Mr. Chairman, Senator, I am honored to be asked to testify before you today on an issue that drives at the heart of your constitutional mandate to provide and to maintain a Navy. I believe we are at a strategic crossroads today, not because we may debate over the numbers of ships that constitute our fleet, but because of how we as a Nation are arriving at those numbers.

The issue at hand is really about retaining the industrial capacity the Nation needs to build the ships it requires to protect its vital interests. In my considered opinion, the trends suggest that the maritime security of the country may be at risk.

I want to reiterate that I for one recognize that the Navy and the Coast Guard do not exist to keep us, the shipbuilding industry, in business. I never believed that when I wore the Nation's cloth and I certainly do not believe it today.

I am a shipbuilder. I build ships. We are in business to build seven different classes of ships at one time today, and we do it well. When the sea services adjust their requirements for cutters, for surface combatants, or expeditionary ships, we will adjust and scale accordingly. The question is not about whether we will need the ships, it is how the Nation is going about acquiring them and at what rate will they be produced. Make no mistake, the Navy and the Coast Guard want the ships that they have on order with us and they want our industry to supply quality assets to the National fleet at affordable cost.

Both customers, however, are in a difficult situation, squeezed for resources to recapitalize, while at the same trying to operate forces at very high operating tempos. You have seen the Navy's well-publicized—in fact, you discussed it earlier—experiment with Sea Swap and the efforts to trim operating and life cycle costs to free up funding. This experiment has and will have a significant and perhaps a lasting impact on the size and the character of our future naval forces.

I must be candid, as a guy who commanded two ships and maintained unit spirit, we in industry are concerned about the choices that are being made today in the name of force economy because those choices may have portentous implications for the future.

For our part, we in industry, in my part of the industry, have transformed in several extraordinary ways. First, because the Navy divested its shipbuilding engineering expertise from its own ranks over the last decade, 7,000 engineers less at Naval Sea Systems Command (NAVSEA), it shifted many key program management responsibilities to industry. This is critical because we in industry have made significant investments in turn to respond to a new role.

I will argue that in Northrop Grumman's management of the DD(X) program to date we have built a new model for the execution of a development program by forming a truly national team that is in Phase Three of the program on cost and on schedule, and want to continue partnering with the Navy to get that ship to sea.

The recently released Government Accountability Office (GAO) report on Navy shipbuilding cost growth argues for an approach which allows for a partnership to develop more credible and realistic cost estimates for first of class ships by working to a detailed design before entering a competition for production contracts.

We believe that we have a responsibility to our shareholders and to the American taxpayer to become the most efficient and competitive military shipbuilder in our business. Last June, I assembled the Northrop Grumman Ship Systems management team to chart a new course for our business, built on the proposition that we can become a more contributive member of our corporation, improve our earnings performance, improve the rate of return on the investments we are making, and at the same time provide better value to our customers.

I think we have come a long way in doing that, and I will tell you a little more in just a second. But we are no longer two shipyards in Northrop Grumman. The notion that Northrop Grumman Ship Systems includes separate shipyards is an anachronistic view. We have streamlined to one sector with facilities within 100 miles of one another and we are sourcing these facilities in Louisiana and Mississippi, while benefiting from a very significant level of investment by both States in our capital modernization program.

The results I think have been dramatic. For example, improved production process for new destroyers have resulted in a reduction of 500,000 man-hours per ship. Construction cycle estimates for the amphibious assault ship (LHD) will be reduced by more than 10 percent and by 20 percent for the LPD by LPD–22.

Here is the catch, Mr. Chairman. There are limits on how much we can achieve in savings, given the production rates that are now projected by our customers, which have fallen dramatically in just the last 6 months. The decrease in the rate of construction is an all too familiar adjustment and the lack of predictability and stability costs the taxpayers heavily.

Some have recently asserted that three new shipyards will have come into business with the introduction of the LCS program. I believe that statement may leave some mistaken impressions. While they are reputable centers of shipbuilding to be sure, these small yards are limited in what they can produce. Northrop Grumman Ship Systems is building capital ships, hard ships, stealthy ships, with capabilities that dwarf those of little ships, capabilities that will be essential if we are to dominate battle space in confrontations with peer competitors and in sea areas where there are no operating sanctuaries in which to hide.

Some will argue that earlier estimates of numbers of the large ships needed were not driven by realistic requirements and that requirements must now be fiscally constrained. Let me offer another truism for your consideration. The fewer sophisticated and complex platforms you build and the slower the production rate, the more costly they will be. The real costs over the long term will come with

the realization that an American shipbuilding industry is not able to surge to meet future security requirements because the industry did not survive.

We have just completed an analysis examining the loss of learning that results from irregular build intervals and the introduction of green or inexperienced labor. It demonstrates conclusively and mathematically that the rate at which we build ships is critical to learning and hence the cost of ships. A steady rate with short intervals between starts of fabrication promotes stable workforce and generates steep learning curves, which significantly reduces production costs. The need for green labor that must be employed is exacerbated by layoffs and then our efforts to rebuild our rolls in reaction to changing requirements or fickle acquisition strategies. "Binges and purges" is how I describe it. This analysis clearly supports arguments for a stable shipbuilding plan for the National fleet.

A very troubling case in point is the Navy's interim fiscal year 2006 annual long-range plan that I know you have been reviewing, which offers us a choice between two 30-year profiles, a 260-ship Navy and one with 325 ships. You will hopefully understand that this scale or range in numbers causes us concern precisely because it makes it impossible for us to make a good business case for the levels of investment in capital and skilled workers we are going to need.

My concern, Mr. Chairman, is that 5 to 8 years from now, not 20 years from now, when the peer competitor emerges, our Nation will discover that our base has atrophied. Our host States, in my case Mississippi and Louisiana, will have ceased investing in shipbuilding facilities with no tax returns. The highly skilled workforce in our shipyards will have gone off to other jobs and new workers will not have been found. The extraordinary intellectual capital—the engineers, the designers—will have migrated to other industries that are seen to have a future where, believe me, their skills are in high demand.

The next generation technologies being developed for ships like DD(X) will never have been developed, and the diaspora of the best and brightest naval engineers working on DD(X) will severely limit future ship choices. In short, you do not just turn a switch for shipbuilders to generate new capacity.

In conclusion, I respectfully submit that the future of military shipbuilding in the United States turns on a national commitment. We cannot have a shipbuilding plan that changes dramatically every year and wreaks havoc on our plans for the industrial base. The instability in shipbuilding has produced sinusoidal waves in workforce and floating rates of return on capital. But with a stable plan we can make our investments and right-size the industrial base to meet the Nation's expectations.

I pledge to you on behalf of the shipbuilders that I represent, Mr. Chairman, that we will honor stable and predictable plans by designing, developing, and building the best and most competitive warships in the world.

Thank you for your consideration.

[The prepared statement of Dr. Dur follows:]

PREPARED STATEMENT BY DR. PHILIP A. DUR

Mr. Chairman, Senators, I am honored to be able to testify before you today. I believe we are at a strategic crossroads today—not just because we may have a debate about the numbers of ships that compose our fleets—but because of how we as a Nation arrive at those numbers. The issue at hand has to do with retaining the essential capability the Nation must have to build the ships essential to its future security. The current path we are on puts this capability at serious risk.

I want to reiterate that, for one, I recognize that the Navy and the Coast Guard do not exist to keep us, the shipbuilding industry, in business. I never believed that when I wore the Nation's cloth and I certainly do not believe it today.

I am a shipbuilder—I build ships. We are in business to build them—seven different designs today—and we do it well. When the sea services adjust their requirements for cutters, surface combatants, or expeditionary ships to do the Nation's business, industry will adjust and scale accordingly. The question is not about whether we will need ships—it is how the Nation is going about acquiring them today and at what rate will they be produced.

Make no mistake, the Navy and the Coast Guard want the ships that are on order and they want industry to maintain the ability to supply quality assets to the national fleet at affordable costs. Both customers, however, are in a difficult situation—squeezed for resources while at the same time trying to transform their forces.

You have seen the Navy's well-publicized experiment with Sea Swap and the efforts to trim operating and life-cycle costs to free up funding for new construction. This transformation has and will have a significant and perhaps lasting impact on the character of our future naval forces. I must be candid and tell you that we, in industry, are concerned about the choices that are being made today in the name of force economy because those choices may have portentous implications for the future.

For our part we have transformed in several extraordinary ways. First, because the Navy divested shipbuilding engineering expertise over the last decade (Naval Sea Systems Command (NAVSEA)'s loss of 7,000 engineers), it shifted many of the key program management responsibilities to our industry. This is critical because we have made significant investments in turn to respond to a new role.

I will argue that in Northrop Grumman's management of the DD(X) program to date, we have built a new model for the execution of a developmental program by forming a truly national team that is—in Phase 3 of the program—on cost and on schedule. The recently released Government Accountability Office (GAO) report on Navy shipbuilding cost growth (Defense Acquisitions, Improved Management Practices Could Help Minimize Cost Growth in Navy Shipbuilding Programs) argues for just such an approach to develop more credible and realistic cost estimates for first-of-a-class ships by working to detailed design before going into contract competition for production.

Second, we believe that we have a responsibility to our shareholders and to the American taxpayer to become the most efficient and competitive shipbuilders in our business.

We are now seeing extraordinary new efficiencies in production—compressed build cycles and reduced amount of rework as a result of our efforts.

Last June, we assembled the Northrop Grumman Ship Systems management team to chart a new course for our business built on the proposition that we can become a more contributive member of the Northrop Grumman Corporation, improve our earnings performance, and improve the return on the investments that our shareholders are making today. We call the initiative "True North"—a new course. We are committed to trimming the controllable elements in our overhead. We are reducing the build-span on the ships that we have under construction. We are improving and have accepted a new standard for ourselves for first time quality. Our Lean Six Sigma processes are now paying very tangible dividends in program cost savings.

We have reorganized the supply chain management organizations across all eight ship class programs that we are currently developing, working to reduce working capital and to put focus on unit assemblies (the building blocks for our ships). We have realigned our management structure so that we have three proven, seasoned experts in shipbuilding and in business disciplines, running the three categories of programs. They are aligned with the customer's organization—expeditionary warfare, surface combatant, and Coast Guard programs.

We are no longer two shipyards. There is not an Avondale shipyard and an Ingalls shipyard. There is a Northrop Grumman Ship Systems sector, a single manufacturing entity. Today, we are sourcing every one of our facilities for elements of

amphibious transport docks (LPDs) and those LPDs are being erected at two different sites.

The notion that the industrial base that is Northrop Grumman Ship Systems includes separate operating shipyards is an anachronistic view. It is atavistic thinking. We have streamlined to one sector and we are sourcing facilities in Louisiana and Mississippi to build ships in either locality, and in some cases even the same ship.

The results for us I believe have been dramatic. For example:

- Improved production processes for new guided missile destroyers (DDGs) brought a reduction of 500,000 man-hours per ship.
- Construction cycle estimates for the amphibious assault ship (LHD) are expected to decrease more than 10 percent, while LPD construction times will shrink more than 20 percent.

Unfortunately, there are limits on how much we can achieve in savings given the production rates currently projected by our customers—which have fallen dramatically in the last 6 months. But this decrease in the rate of construction is an all-too-familiar adjustment, and the lack of predictability and stability costs the taxpayer heavily.

As shipbuilding gets pushed out into the future, the return on that investment declines. As fewer ships in each program are built, the cost per ship goes way up. In that way, the true cost of "cost-savings" attained through reduced quality can actually prove to be prohibitively expensive.

If we were building automobiles or even small ships this might be an acceptable path—but we are not. Some spokesmen have recently asserted that three new shipyards had come into business with the introduction of the littoral combat ship (LCS) program. I believe that statement may leave mistaken impressions. While reputable centers of shipbuilding to be sure, these yards are limited in what they can produce. Northrop Grumman is building capital ships—hard ships, stealthy ships with capabilities that dwarf those ships we designed and built just 10 years ago—capabilities that will dominate the battle space in wars with peer competitors where there are no operating sanctuaries in which to hide.

Some will argue that earlier estimates of ship numbers were not driven by requirements, and that requirements must be fiscally constrained. Let me offer another truism for consideration: the fewer of these sophisticated and complex platforms you build, and the slower the production rate, the more costly they will be. The real cost, over the long term, will come with the realization that an American shipbuilding industry is not able to surge to future security requirements because the industry did not survive.

To the point of how cost is driven by numbers and production rates: We have just completed an analysis examining the loss of learning that results from irregular build intervals and the introduction of "green labor."

This analysis demonstrates conclusively and mathematically what has always been intuitively obvious to us—the rate at which we build ships is critical to stability in learning and hence the cost of ships. A steady rate with shorter intervals between start of fabrication promotes stable workforce and generates a steep learning curve, which significantly reduces production costs. The amount of "green," or "unskilled labor" that must be employed is exacerbated by peaks and valleys caused by our need to lay off and then build back up as a reaction to changing requirements or acquisition strategies—"binges and purges" is how I describe it. The analysis clearly supports arguments for a stable shipbuilding plan for the National Fleet.

A case in point is the recent release of the Navy's interim fiscal year 2006 Annual Long-Range Plan for the Construction of Naval Vessels. This study offers a choice of two 30-year fleet profiles—a 260 ship Navy and one with 325 ships. You will hopefully understand that this scale or range in future fleet numbers causes concern for us in industry and because it becomes almost impossible to make sound business cases for levels of investment in capital and skilled workers.

The decisions we make today will shape our naval force structure for decades to come. Ships take a long time to build. Because the effects of those decisions are not immediately apparent, we can easily slip into a false sense of security.

Those of us who build these ships, however, see the effects up front—in a declining labor force—in a reduced ability to attract capital—in a shrinking industrial base that may not be there in the future when we need it.

My concern is that 5 to 8 years out our Nation will discover that our Navy has dangerously atrophied.

- The highly-skilled workforce in our shipyards will have gone off to other jobs . . . and new workers will not have been trained.

- The extraordinary intellectual capital—the engineers, designers, scientists—will have migrated to other industries that are seen to have a future, where, believe me, their skills are in high demand.
- The next-generation technologies being developed for ships like the DD(X) will never have been developed—and the diaspora of the best and brightest naval engineers will severely limit future choices.

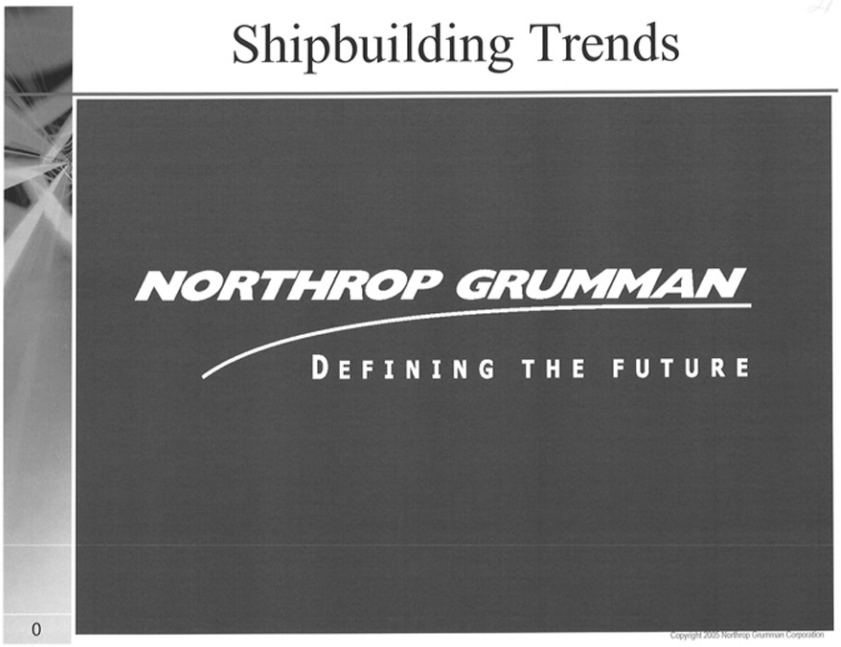
In short, you don't just turn a switch for shipbuilders to generate new capacity.

The future of shipbuilding in the United States requires nothing short of a national commitment. We cannot have shipbuilding plans that dramatically change every year and wreak havoc on our industrial base. (Present PPT slides on "churn" in force level requirements). The Nation, and Congress in particular, need to decide what the National Fleet of the future should be—the aggregate of Coast Guard and Navy ship requirements.

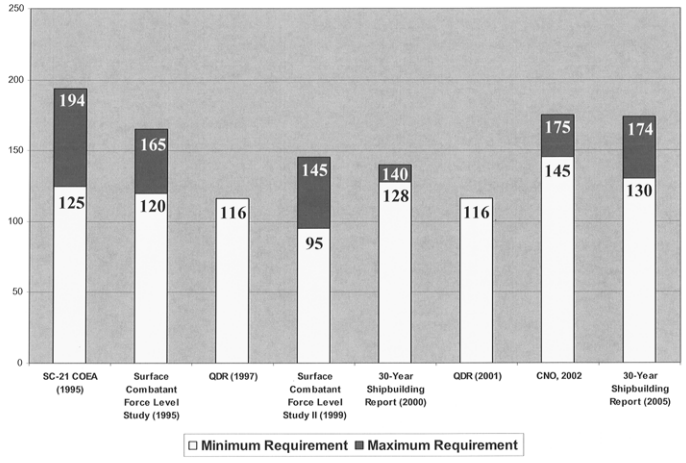
The instability in shipbuilding rates has produced sinusoidal waves in workforce. How can we invest in capital projects if we do not have a clear business gauge to show a return to our investors? There is a prohibitively high cost to the Nation for this turbulence—measured in dollar costs and lost capabilities to shape world events, respond to crisis and fight wars. With planning stability we can adjust our investments and right-size the industrial base to meet the Nation's expectations.

We of Northrop Grumman Ship Systems build warships, conventionally powered surface combatants and expeditionary warfare ships and cutters. The future of the American shipbuilding industry will be determined by a national commitment to build a fleet based on clearly defined force requirements consistently funded by a long-term resourcing plan.

I pledge to you, on behalf of the American shipbuilder, that we will honor such a commitment by designing, developing and building the best and most competitive warships in the world.



Churn in Surface Combatant force level requirements



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Shipbuilding reductions from previous plans

Program	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	Total
DDG 51	2			1							
DD(X)				1 0	1 0	2 1	2 1	2 3 1	1	1	
LPD 17	2 1	2 1	2 1	1	1	1	1 0	1 0	1 0		
LHD 8			1	1 0							
LHA(R)						1	1 0	1 0	1		
MPF(Future)						1 0	1 0	1 3 1	1	2	
NGSS POM02	4	2	2	3							11
NGSS POM03	3	1	1	4	1	1					11
NGSS POM04	3	1	1	4	2	3	3	4			21
NGSS PR05	3	1	2	3	2	4	4	7	4		30
NGSS POM06	3	1	2	2	1	3	1	2	3	3	21

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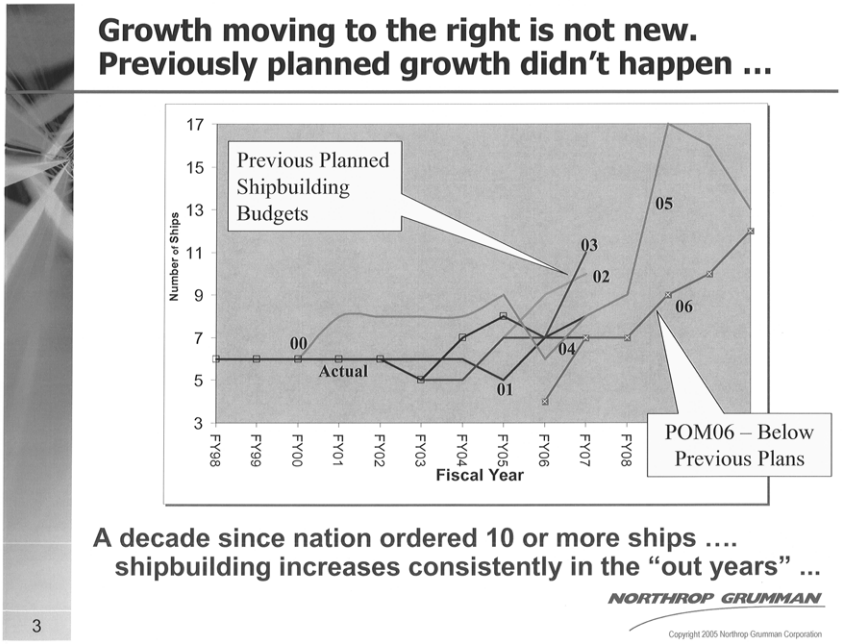
2



Senator TALENT. Thank you for that powerful statement, Dr. Dur.

Mr. O'Rourke, who has for 20 years been a specialist in naval power with CRS, you are next. I do really want you to paraphrase your statement for us. Of course, the whole thing will go in the record. We are eager to get to the questions. Please.

STATEMENT OF RONALD O'ROURKE, NATIONAL DEFENSE SPECIALIST, CONGRESSIONAL RESEARCH SERVICE

Mr. O'ROURKE. Understood. Chairman Talent, thank you for the honor to be here today. I will briefly summarize my testimony here in a few remarks.

For the shipbuilding industrial base, a significant current issue, as I think you have heard, is ambiguity regarding required numbers of Navy ships and year-to-year volatility in the Navy shipbuilding program. This situation can make it difficult for shipbuilders to make decisions in areas such as workforce management and facilities investment. It can also make it difficult for Congress to conduct effective oversight of Navy shipbuilding programs.

Recent Navy testimony and reports on required numbers of ships, though helpful, do not do very much to resolve this ambiguity. Of the 49 ships in the FYDP, 21 or more than 40 percent are littoral combat ships that are to be built at yards other than the six yards that have built the Navy's major ships in recent years. The 28 remaining ships in the FYDP equate to an average of 4.7 ships per year, or an average of less than one ship per year for each of the six yards.

Regarding submarines, there is concern for the stability of the design and engineering base, which is facing the near-term prospect, for the first time in more than 40 years, of having no major submarine design project on which to work. One option for addressing this situation would be to start design work now on a new submarine, which could be financed using some portion of the $600 million budgeted for a future undersea superiority system. A new-design nuclear-powered attack submarine incorporating the so-called Tango Bravo technologies could be equivalent in capability to the *Virginia* class, but cost substantially less. Such a boat could be more easily procured within available resources at a rate of two per year, which is the rate you will need, starting in fiscal year 2012 or 2013, to avoid dropping below 40 boats. If design work is begun now, the first boat might be ready for procurement by fiscal year 2011.

Regarding surface combatants, if the Navy holds a winner-take-all competition for the DD(X) the consequences for the losing yard could be very serious, particularly if it is Bath. In addition, the Navy's decision to reduce the DD(X) to one per year in the FYDP is a signal that, unless budget conditions change, DD(X) and CG(X) procurement may never be more than one per year. Notwithstanding the capabilities of the DD(X) and CG(X), the prospect of a one-per-year rate could cause the DD(X)–CG(X) effort to be judged unsatisfactory in terms of introducing the DD(X)–CG(X) technologies in sufficient numbers and in terms of getting average total acquisition cost below $3 billion a copy.

Dissatisfaction on one or both of these points could lead to a decision to terminate the entire DD(X)–CG(X) effort. If such a decision were made in the near term, a single DD(X) might be built as a technology demonstrator and a second might be procured to give the other yard experience in building the design. If a decision to terminate is made at a later point, a few more DD(X)s might be procured. But in either case, no CG(X)s might be procured.

The DD(X) has been described as a bridge to the CG(X) in fiscal year 2011, but it is possible the Navy and the industrial base might cross that bridge only to discover that, for cost reasons, the CG(X) is no longer waiting at the other end.

There are several options for supporting the surface combatant industrial base between now and fiscal year 2011. An additional option for supporting the base in fiscal year 2011 and beyond would be to begin design work now on a new surface combatant that would be smaller and less expensive than the DD(X) or CG(X). Such a ship, which might be about the same size as today's Aegis cruisers and destroyers, would have a smaller payload than the DD(X) or CG(X), but it could carry many of the same technologies as the DD(X) or CG(X) and it could be more easily procured within available resources at a rate of two per year, which is a rate that might meet operational needs better and be easier to divide between two yards.

If the DD(X)–CG(X) effort is terminated and no new surface combatant design is ready for immediate procurement, it could create operational risks. It could also place enormous stress on the surface combatant industrial base. The submarine industrial base went through a period like this in the 1990s when the *Seawolf* program

was terminated and the *Virginia* class was not yet ready for procurement.

My testimony also covers the three independent studies on fleet architecture and I will just say right now, in concluding, that those studies contain recommendations which themselves may have implications for the industrial base.

Mr. Chairman, that concludes my statement and I will be happy to respond to any questions the subcommittee might have.

[The prepared statement of Mr. O'Rourke follows:]

PREPARED STATEMENT BY RONALD O'ROURKE

Mr. Chairman, distinguished members of the subcommittee, thank you for the opportunity to appear before you to discuss Navy capabilities and the force structure required to provide them. As requested, my testimony will focus on the following:

- the status of the shipbuilding industrial base (pages 1–6);
- the impact of current Navy shipbuilding plans on the industrial base (pages 6–21); and
- naval capabilities and the recent independent studies on fleet architecture (pages 22–42).

STATUS OF SHIPBUILDING INDUSTRIAL BASE

Current Situation

Annual Navy ship procurement declined substantially in the early 1990s, following the end of the Cold War, and today remains substantially below Cold War levels of the 1980s. As a result, among other things:

- current shipyard workloads and employment levels in many cases are below Cold War levels of the 1980s;
- some yards have considerable unused capacity;
- production economies of scale are often limited or poor, putting upward pressure on unit production costs;
- opportunities for the Navy to use periodic (e.g., annual or biannual) competition in the awarding of shipbuilding contracts so as to gain the benefits of competition in production are limited; and
- concerns have increased regarding prospects for Navy shipbuilding supplier firms, many of which are sole sources of what they make for the Navy.

Improved Processes and Methods

The six yards that have built the Navy's major warships in recent years [1] have taken various steps over the last decade or so to improve their ship-design and ship-production processes and methods. These steps have narrowed, but perhaps not closed, the gap in these processes and methods between the six yards and the world's most modern and capable shipyards. A Department of Defense (DOD) report scheduled for completion later this year will address this issue in more detail.[2]

Rising Material And Component Costs

The six yards have experienced rising costs for materials and components provided to them by supplier firms. These rising costs are a contributor to increasing procurement costs for Navy ships.

Dependence on Navy Work and Opportunities For Other Work

As a group, the six yards are highly dependent on Navy shipbuilding contracts, as they have been for many years. A potentially significant non-Navy source of shipbuilding work in coming years is procurement of large and medium cutters under

[1] These are the three yards owned by General Dynamics—Bath Iron Works (GD/BIW) of Bath, ME, the Electric Boat Division (GD/EB) of Groton, CT, and Quonset Point, RI, and National Steel and Shipbuilding Company (GD/NASSCO) of San Diego, CA—and the three yards owned by Northrop Grumman—Avondale Shipyards (NG/Avondale) near New Orleans, LA, Ingalls Shipbuilding (NG/Ingalls) of Pascagoula, MS, and Newport News Shipbuilding (NGNN) of Newport News. NG/Avondale and NG/Ingalls, together with a third production facility at Gulfport, MS, form Northrop Grumman Ship Systems (NGSS).

[2] The report being prepared by DOD has been referred to as the Global Shipbuilding Industrial Base Benchmarking Study. For a press article discussing this study, see Christopher J. Castelli, "Patrick: Congress Has Key Role In Examining U.S. Industrial Base," Inside the Navy, February 28, 2005.

the Coast Guard Deepwater program, particularly if procurement of these cutters is accelerated and expanded.[3]

A second potential non-Navy source of shipbuilding work is building warships for export for foreign countries. Although U.S. yards welcome and pursue this work, it tends to be a highly uncertain source of work because it depends on decisions made by foreign governments who in many cases are also considering competing designs offered by foreign yards. In addition, because of the small sizes of most foreign navies, the numbers of ships being contemplated for purchase by these governments tend to be rather small. One current opportunity in this area is the project announced by the administration in 2001 to provide eight non-nuclear-powered submarines to Taiwan.

A third potential non-Navy source of shipbuilding work is building ocean-going commercial ships, which is an activity that declined substantially in the United States following the end in 1981 of the Construction Differential Subsidy (CDS) that had previously supported such work. Options for increasing the amount of commercial-ship construction work performed in U.S. yards have been discussed or pursued by Congress at various times, particularly since the early 1990s, when the construction rate of large Navy ships declined.

Some of the six yards that have built the Navy's major warships in recent years have explored opportunities for building commercial ships, but with only limited results.[4] Yards that are configured for building complex combatant ships may face certain challenges in attempting to become competitive builders of commercial ships.[5] One option that might make it easier for U.S. yards that build complex combatants to compete for commercial-ship construction work would be to make Navy combatant ships more like commercial ships. The Office of Force Transformation (OFT) report on alternative fleet architectures discussed later in this testimony essentially

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[3] For more on the Deepwater program, see CRS Report RS21019, Coast Guard Deepwater Program: Background and Issues for Congress, by Ronald O'Rourke.

[4] GD/BIW, for example, examined the option during the 1990s but ultimately decided against attempting to enter the market. As another example, NGNN in the 1990s started a program to build double-hulled tankers, but lost money on the project and stopped it after building a few ships. The project left NGNN skeptical about the potential for building commercial ships profitably at NGNN. (See Jason Ma, "Newport News Chief Skeptical About Entering Commercial Ship Market," Inside the Navy, March 14, 2005.)

[5] Yards that are competitive builders of commercial ships traditionally have been configured somewhat differently from yards that focus on building complex combatant ships. Commercial ships typically require less outfitting of their interiors than complex combatant ships, so yards that are competitive builders of commercial ships traditionally have had work forces with a fairly high percentage of basic steel workers (who build the shell of the ship) and lower numbers of outfitters, while yards that focus on building complex combatant ships traditionally have had work forces that have included larger numbers of outfitters. In addition, yards that focus on building complex combatant ships have equipment for assembling, integrating, and testing complex ship combat systems and (in the case of GD/EB and NGNN) equipment for assembling, installing, and testing nuclear-propulsion equipment. The additional costs associated with maintaining larger numbers of outfitters and equipment related to complex combat systems and nuclear propulsion can pose challenges to complex combatant yards seeking to enter the commercial-ship construction market.

Among the six yards that currently build the Navy's larger warships, the yards for which the option of increasing commercial-ship construction work currently might be most suitable are GD/NASSCO and NG/Avondale. GD/NASSCO builds auxiliary and sealift ships for the Navy and DOD. Since these ships are similar in design and complexity to commercial ships, GD/NASSCO is similar to purely commercial shipbuilding yards in terms of numbers of outfitters and lack of equipment related to complex combat systems and nuclear propulsion. GD/NASSCO pursues commercial-ship construction work, and its workload is often a mix of commercial ships and Navy/DOD auxiliaries and sealift ships. The yard is currently building 185,000 DWT oil tankers for BP Oil Shipping Company USA. A total of four of these ships are to be delivered by 2006. The ships are to be used for transporting crude oil from Valdez, Alaska, to oil refineries on the U.S. West Coast, meaning that these ships fall under the Jones Act (Section 27 of the Merchant Marine Act of 1920 [46 USC. 883]), which, as discussed in a CRS Report (Report RS21566, The Jones Act: An Overview, by John F. Frittelli), "requires that all waterborne shipping between points within the United States be carried by vessels built in the United States, owned by U.S. citizens (at least 75 percent), and manned with U.S. citizen crews. The act essentially bars foreign built and operated vessels from engaging in U.S. domestic commerce."

NG/Avondale has also built auxiliary and sealift ships for the Navy and DOD, but its current workload includes construction of LPD–17 amphibious ships, which are somewhat complex in terms of their outfitting requirements and combat systems. Recent commercial-ship construction work at NG/Avondale includes 125,000 DWT oil tankers built for Polar Tankers, Inc. The first of five such ships was delivered in 2001. These ships also appear intended for transporting crude oil from Alaska to the U.S. West Coast, which would qualify them under the Jones Act. (Avondale's web site [http://www.ss.northropgrumman.com/company/ avondale.cfm] states: "These 895-foot-long, 125,000 DWT ships are capable of carrying more than 1 million barrels of crude oil along the treacherous trade route from Alaska to the U.S. West Coast.")

proposes this by using a merchant-like hull as the basis for building four kinds of large surface ships.

Ambiguity And Volatility In Navy Plans

A significant current issue for the shipbuilding industrial base is ambiguity regarding required numbers of Navy ships and year-to-year volatility in the composition of the Navy's 6-year shipbuilding plan. Ambiguity concerning required numbers of Navy ships may make it easier for industry officials to pour into broad remarks from the Navy or DOD their own hopes and dreams for individual programs. This could lead to excessive industry optimism about those programs.

In addition, ambiguity concerning required numbers of Navy ships, combined with year-to-year volatility in Navy shipbuilding plans, can make it difficult for shipbuilding firms to make business decisions in areas such as production planning, workforce management, facilities investment, company-sponsored research and development, and potential mergers and acquisitions.[6]

Ambiguity concerning required numbers of Navy ships may also make it difficult, if not impossible, for Congress to conduct effective oversight by reconciling desired Navy capabilities with planned Navy force structure, and planned Navy force structure with supporting Navy programs and budgets. With the middle element of this oversight chain expressed in only general terms, Congress may find it difficult to understand whether proposed programs and budgets will produce a Navy with DOD's desired capabilities. The defense oversight committees in recent years have criticized the Navy for presenting a confused and changing picture of Navy ship requirements and procurement plans.[7]

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[6] In an interview published in the February 2005 issue of Seapower magazine, for example, Michael Petters, the president of NGNN, said:

"If there was a clear, stable picture of what the Navy wants, and what sort of infrastructure needs to be in place to support that, the industry would adapt. But what you've had instead are the annual perturbations. That's a challenge for us. We make investments in ships that take 8 years to build, then the ship gets delayed because of the way the budget process works."

In the same published interview, Michael W. Toner, the executive vice president of General Dynamics' Marine Systems Group, said:

"Mike [Petters] is dead on. I think Secretary [of the Navy Gordon] England has it right, but it's up to the Navy to establish the stability. What's the plan? Give us a stable plan and then we can make the investments. Industry will do what industry needs to do. But it is a very difficult environment to make investment in, that's for sure." ("Shipbuilding: An Uncertain Future," Seapower, February 2005: 28.)

Similarly, a July 2004 press article stated:

"Philip Dur, chief executive officer of Northrop Grumman's Shipbuilding Systems, argued that the Navy's concept of 'capabilities versus numbers' not only would hurt the Service's operations, but decimate the industry."

"If the Navy decides it cannot afford 300 ships, it should come up with a smaller number and set new ship construction plans based on that number, Dur said."

"It also would be helpful, he added, if both the Navy and the Coast Guard jointly planned their long-term shipbuilding buys. 'I do not know that either Service takes the other Service's capabilities into account,' he said. If both services set their shipbuilding goals collectively, 'then the shipbuilders can lay out an investment plan, a hiring plan [and] a training plan that was predicated on the assumption that we would competing for an X-number of platforms per year on a going-forward basis,' Dur said. . . ."

"If the Department of Defense can frame a requirement for ships and defend it, the industry would make the necessary adjustments to either scale down or ramp up, Dur told reporters during a recent tour of the company's shipyards in Louisiana and Mississippi. (Roxana Tiron, "Lack of Specificity in Navy Shipbuilding Plans Irks the Industry," National Defense, July 2004.)

[7] For example, the conference report (H.Rept. 107–772 of November 12, 2002) on the National Defense Authorization Act for Fiscal Year 2003 (P.L. 107–314/H.R. 4546) stated

"In many instances, the overall Department of Defense ship acquisition message is confused. . . . The conferees also believe that the DON shares blame for this confusion because it has been inconsistent in its description of force structure requirements. This situation makes it appear as if the Navy has not fully evaluated the long-term implications of its annual budget requests. . . .

"The conferees perceive that DOD lacks a commitment to buy the number and type of ships required to carry out the full range of Navy missions without redundancy. The DON has proposed to buy more ships than the stated requirement in some classes, while not requesting sufficient new hulls in other classes that fall short of the stated requirement. Additionally, the conferees believe that the cost of ships will not be reduced by continually changing the number of ships in acquisition programs or by frequently changing the configuration and capability of those ships, all frequent attributes of recent DON shipbuilding plans." (Pages 449 and 450)

The House Appropriations Committee, in its report (H.Rept. 108–553 of June 18, 2004) on the Fiscal Year 2005 DOD appropriations bill (H.R. 4613), stated:

"The committee remains deeply troubled by the lack of stability in the Navy's shipbuilding program. Often both the current year and out year ship construction profile is dramatically altered with the submission of the next budget request. Programs justified to Congress in terms of mission requirements in 1 year's budget are removed from the next. This continued shifting

The Navy's February 2005 testimony that in future years it may require a total of 260 to 325 ships, or possibly 243 to 302 ships, depending on how much the Navy uses new technologies and the Sea Swap concept for crewing and deploying ships,[8] and the Navy's March 2005 interim report to Congress on long-range shipbuilding requirements, which details the composition of 260- and 325-ship fleets for fiscal year 2035,[9] together do not resolve the current ambiguity regarding required numbers of Navy ships, for the following reasons:

- Using the 260-ship fleet as a baseline, the range of 260 to 325 ships equates to a 25 percent range of variability in the potential total number of ships. Although for some ship categories, such as ballistic missile submarines and cruise missile submarines, there is little or no difference in the number of ships included in the 260- and 325-ship fleets, for other ship categories, there are substantial differences. When translated into percentage terms, the difference is 37 percent for cruisers and destroyers, 30 percent for littoral combat ships, 41 percent for amphibious ships, and 43 percent for maritime prepositioning ships. For the remaining categories of ships—attack submarines, aircraft carriers, combat logistics ships, and other ships—the percentage ranges of variability are 10 percent or less. In the case of aircraft carriers, however, the one-ship difference under two fleet plans can translate into a substantial difference in Navy funding requirements and shipbuilding work.
- The Navy's testimony and report do not make clear whether the range of 260 to 325 ships, or the compositions of the 260- and 325-ship fleets, have been endorsed by the Secretary of Defense as official Department of Defense (DOD) force-structure planning goals.
- The March 2005 report does not present a 30-year shipbuilding plan. Instead, it presents a 30-year projection of potential Navy force levels from which potential annual shipbuilding rates can be only partially inferred.

IMPACT OF NAVY SHIPBUILDING PLANS ON INDUSTRIAL BASE

Overall Ship-Procurement Rate

The fiscal year 2006–fiscal year 2011 plan (see Table 1) would procure a total of 49 ships, or an average of about 8.2 ships per year. Assuming an average Navy ship life of 30 to 35 years, an average procurement rate of about 8.2 ships per year would, over the long run, maintain a fleet of 245 to 286 ships.

TABLE 1. NAVY FISCAL YEAR 2006–FISCAL YEAR 2011 SHIP-PROCUREMENT PLAN

(Ships fully funded in fiscal year 2005 shown for reference)

	Fiscal Year							Total Fiscal Year 2006–2011
	2005	2006	2007	2008	2009	2010	2011	
CVN–21			1				1	
SSN–774	1	1	1	1	1	1	1	6
DDG–51	3							0
DD(X)			1	1	1	1	1	5
CG(X)							1	1
LCS	1	1	2	3	5	5	5	21
LPD–17	1	1	1					2
LHA(R)			1			1		2
TAKE	2	1	1	1				3
TAOE(X)					1	1	2	4
MPF(F)					1	1	2	4

of the shipbuilding program promotes confusion and frustration throughout both the public and private sectors. Moreover, the committee is concerned that this continual shifting of priorities within the Navy's shipbuilding account indicates uncertainty with respect to the validity of requirements and budget requests in support of shipbuilding proposals." (Page 164)

[8] See, for example, Statement of Admiral Vernon Clark, USN, Chief of Naval Operations, Before the Senate Armed Services Committee, 10 February 2005, pp. 18–19, and Statement of Admiral Vernon Clark, USN, Chief of Naval Operations, Before the House Armed Services Committee, 17 February 2005, pp. 19–20.

[9] U.S., Department of the Navy, An Interim Report To Congress on Annual Long-Range Plan For The Construction Of Naval Vessels For Fiscal Year 2006. Washington, 2005. 5 pp. (This report was delivered to the defense committees of Congress on March 23, 2005. Defense trade publications obtained copies of the report and at least one publication posted the report on its Web site.)

TABLE 1. NAVY FISCAL YEAR 2006–FISCAL YEAR 2011 SHIP-PROCUREMENT PLAN—Continued

(Ships fully funded in fiscal year 2005 shown for reference)

	Fiscal Year							Total Fiscal Year 2006–2011
	2005	2006	2007	2008	2009	2010	2011	
MPF(A)								0
TOTAL	8	4	7	7	9	10	12	49
TOTAL less LCSs	7	3	5	4	4	5	7	28

Source: Department of the Navy, Highlights of the Department of the Navy Fiscal Year 2006 Budget, Chart 14 (p. 5–1).

As shown in the table, Littoral Combat Ships (LCSs) account for 21 of these 49 ships, or about 43 percent. LCSs are to be built by yards other than the six yards that have built the Navy's major warships in recent years. Setting aside LCSs so as to focus on larger ships that would likely be built by these six yards, the total number of larger ships is 28, or an average of about 4.7 ships per year. Assuming an average Navy ship life of 30 to 35 years, an average procurement rate of about 4.7 ships per year other than LCSs, if maintained over the long run, would maintain a fleet that included 140 to 163 ships other than LCSs.

An average procurement rate of 4.7 ships per year other than LCSs would be about equal to the relatively low rates of Navy ship procurement of the mid- to late 1990s.[10] For the six shipyards that have built the Navy's major warships in recent years, this average ship procurement rate would result, as a general matter, in relatively low work loads, revenues, and employment levels. Production economies of scale would be limited or poor, putting upward pressure on unit production costs. Layoffs may occur at some of the yards, and the two companies that own these yards may be less inclined to commit to new investments aimed at improving the yards' production facilities.

Individual Shipbuilding Programs

CVN–21 Aircraft Carrier Program

CVN–21, the next aircraft carrier, is to be built by Northrop Grumman Newport News (NGNN). Compared to the fiscal year 2005–fiscal year 2009 ship procurement plan submitted to Congress in February 2004, the fiscal years 2006–2011 plan would defer the procurement of CVN–21 by a year, to fiscal year 2008. Navy officials state this was due to the need to finance the procurement in fiscal year 2007 of other ships, including the lead DD(X) destroyer and the LHA(R) amphibious assault ship. The fiscal years 2006–2011 plan would also defer the procurement of the carrier after CVN–21 from fiscal year 2011 to fiscal year 2012.[11]

Navy officials state that the deferral of CVN–21 to fiscal year 2008 increased CVN–21's procurement cost by about $400 million. The deferral lengthened the already-considerable production gap at NGNN between CVN–21 and the previous carrier, CVN–77, which was procured in fiscal year 2001. Lengthening this gap reduced the shipyard's ability to efficiently shift workers coming off the CVN–77 production effort onto the CVN–21 effort. As a result, workers coming off the CVN–77 production effort could instead be furloughed, and any new workers hired later to support the start of CVN–21 construction could require training and be less productive initially than experienced workers.

The lengthened gap between CVN–77 and CVN–21 may also increase costs for attack submarine construction work done at NGNN because that work might, for a time, need to bear a somewhat higher share of the shipyard's fixed overhead costs.

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[10] The table below shows the number of battle force ships funded by Congress from fiscal year 1982 through fiscal year 2005.

Battle Force Ships Procured (Fiscal Years 1982–2005)

1982 - 17	1983 - 14	1984 - 16	1985 - 19	1986 - 20	1987 - 17
1988 - 15	1989 - 19	1990 - 15	1991 - 11	1992 - 11	1993 - 7
1994 - 4	1995 - 4	1996 - 5	1997 - 4	1998 - 5	1999 - 5
2000 - 6	2001 - 6	2002 - 6	2003 - 5	2004 - 7	2005 - 8

Source: CRS compilation based on examination of defense authorization and appropriation committee and conference reports for each fiscal year. The table excludes non-battle force ships that do not count toward the 310- or 375-ship goal, such as sealift and prepositioning ships operated by the Military Sealift Command and oceanographic ships operated by agencies such as the National Oceanic and Atmospheric Administration (NOAA).

[11] For more on the CVN–21 program, see CRS Report RS20643, Navy CVN–21 Aircraft Carrier Program: Background and Issues for Congress, by Ronald O'Rourke.

SSN–774 Attack Submarine Program

Virginia (SSN–774) class submarines are built jointly by GD/EB and NGNN. The fiscal years 2006–2011 plan would maintain *Virginia*-class procurement at one per year through fiscal year 2011. The fiscal years 2005–2009 plan had called for increasing *Virginia*-class procurement to two per year starting in fiscal year 2009.[12] Keeping *Virginia*-class procurement at one per year through fiscal year 2011 would result in *Virginia*-class work loads, revenues, and employment levels at GD/EB and NGNN that are about equal to current levels. As a result, production economies of scale for submarines would continue to remain limited or poor.

The part of the submarine industrial base that some observers are currently most concerned about is not the construction portion, but the design an engineering portion, much of which is resident at GD/EB and NGNN. With *Virginia*-class design work now winding down and no other major submarine-design project underway, the submarine design and engineering base is facing the near-term prospect, for the first time in about 50 years, of having no major submarine design project on which to work.

Some Navy and industry officials are concerned that unless a major submarine design project is begun soon, the submarine design and engineering base will begin to atrophy through the departure of experienced personnel. Rebuilding an atrophied submarine design and engineering base, these Navy and industry officials believe, could add substantial time and cost to the next submarine design effort, whenever it might begin. Concern about this possibility among some Navy and industry officials has been strengthened by the U.K.'s recent difficulties in designing its new *Astute*-class SSN. The U.K. submarine design and engineering base atrophied for lack of submarine design work, and the subsequent *Astute*-class design effort has experienced considerable delays and cost overruns. Submarine designers and engineers from GD/EB were assigned to the *Astute*-class project to help the U.K. overcome these problems.[13]

DD(X) Destroyer Program

DD(X) destroyers are to be built by GD/BIW and/or NG/Ingalls. The fiscal year 2005–fiscal year 2009 plan had called for procuring a total of eight DD(X)s through fiscal year 2009—one in fiscal year 2005, two in fiscal year 2007, another two in fiscal year 2008, and three in fiscal year 2009. The fiscal years 2006–2011 plan would reduce procurement to one ship per year for the period fiscal years 2007–2011.[14]

A comparison of the fiscal years 2006–2011 plan to the fiscal years 2005–2009 plan suggests at first that the fiscal years 2006–2011 plan has deferred the procurement of the lead DD(X) destroyer by 2 years, to fiscal year 2007. The actual effect of the fiscal years 2006–2011 plan on the schedule for building this ship, however, appears to be less dramatic.[15]

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[12] For more on the SSN–774 program, see CRS Report RL32418, Navy Attack Submarine Force-Level Goal and Procurement Rate: Background and Issues for Congress, by Ronald O'Rourke.

[13] See, for example, Andrew Chuter, "U.K. Spending Mounts For U.S. Help On Sub," Defense News, September 13, 2005: 4; Richard Scott, "Electric Boat Provides Project Director For Astute Class," Jane's Navy International, May 2004: 33; Richard Scott, "Astute Sets Out On The Long Road To Recovery," Jane's Navy International, December 2003: 28–30; Richard Scott, "Recovery Plan Shapes Up For Astute Submarines," Jane's Defence Weekly, November 19, 2003: 26.

[14] For more on the DD(X) program, see CRS Report RS21059, Navy DD(X) and CG(X) Programs: Background and Issues for Congress, by Ronald O'Rourke, and CRS Report RL32109, Navy DD(X), CG(X), and LCS Ship Acquisition Programs: Oversight Issues and Options for Congress, by Ronald O'Rourke.

[15] The Navy's fiscal year 2005–fiscal year 2009 plan proposed funding the construction of the lead DD(X) in the Navy's research and development account through a stream of annual funding increments stretching out to fiscal year 2011—an approach commonly known as incremental funding. Under this proposed scheme, the Navy had some flexibility to choose which year to record as the nominal year of procurement for the lead DD(X). The Navy chose fiscal year 2005, the year of the first scheduled increment, even though the amount of funding requested for the fiscal year 2005 increment equated to only about 8 percent of the ship's total cost, leaving the remaining 92 percent of the ship's cost to be provided in future years.

Congress, in acting on the Navy's proposed fiscal year 2005 budget, approved the Navy's fiscal year 2005 funding request for the lead DD(X) but directed that the ship be procured the traditional way, through the Navy's shipbuilding account (known formally as the Shipbuilding and Conversion, Navy, or SCN, account), and that it be funded the traditional way, in accordance with the full funding policy, which requires that items acquired through the procurement title of the DOD appropriation act be fully funded in the year they are procured. Consistent with this direction, the fiscal year 2005 funding increment was designated as advance procurement (AP) funding for a lead DD(X) to be procured in some future fiscal year.

Continued

The fiscal years 2006–2011 Navy plan, however, defers the procurement of the second DD(X) by a year, to fiscal year 2008, and as mentioned above, reduces DD(X) procurement to one per year for the 5-year period fiscal years 2007–2011.

The Navy has recently testified that it requires a total of 8 to 12 DD(X)s. Under previous plans, however, the Navy envisioned stopping DD(X) procurement at about the time that it started CG(X) procurement. If the lead CG(X) is procured in fiscal year 2011, as shown in the fiscal years 2006–2011 plan, and there is a gap year in fiscal year 2012 between the procurement of the lead CG(X) and follow-on CG(X)s starting in fiscal year 2013, then a sixth DD(X) might be procured in fiscal year 2012. If so, then the total procurement quantity for the DD(X) program would be six ships.[16] The fiscal years 2006–2011 FYDP, however, contains no advance procurement funding in fiscal year 2011 to support the procurement of a sixth DD(X) in fiscal year 2012.

Supporters of the surface combatant industrial base expressed concern last year about the gap between the end of DDG–51 procurement and the start of DD(X) procurement. This gap, supporters argued, would make it difficult for the industrial base to manage the transition from DDG–51 production to DD(X) production. The fiscal years 2006–2011 plan appears to increase the length of this gap, which would likely intensify these concerns.

The light-ship displacement of the DD(X) design (about 12,135 tons) is about 75 percent greater than that of the DDG–51 design (about 6,950 tons). If shipyard construction work is roughly proportional to light-ship displacement, then building a DD(X) might generate about 75 percent more shipyard work than building a DD(X), and building one DD(X) per year would be equivalent to building 1.75 DDG–51s per year.

Supporters of GD/BIW and NG/Ingalls have argued in previous years that three DDG–51s per year, in conjunction with other work being performed at the two yards (particularly NG/Ingalls), is the minimum rate needed to maintain the financial health of the two yards. Navy officials in recent years have questioned whether this figure is still valid. Building the equivalent of 1.75 DDG–51s per year equates to about 58 percent of this rate. If the minimum rate of three DDG–51 equivalents per year is valid, then the one-per-year procurement rate for the DD(X) program may raise questions about the potential future financial health of these yards.

Until recently, the DD(X) acquisition strategy called for the first DD(X) to be built by NG/Ingalls and the second by GD/BIW, and for the construction contracts for the first six DD(X)s to be divided evenly between the two yards. As a result of the reduction in the planned DD(X) procurement rate, however, the Navy is considering holding a competition between the two yards for the right to become the sole builder of the DD(X).

If the Navy holds such a competition, then the consequences for the yard that loses the competition could be very serious. GD/BIW is involved as a shipbuilder in no shipbuilding programs other than the DDG–51 and DD(X).[17] Consequently, if GD/BIW loses the DD(X) competition and does not receive other new ship-construction work, then GD/BIW could experience a significant reduction in workloads, revenues, and employment levels by the end of the decade. Theoretical scenarios for the yard under such circumstances could include closure and liquidation of the yard, the "mothballing" of the yard or some portion of it, or reorienting the yard into one that focuses on other kinds of work, such as building commercial ships, overhauling and modernizing Navy or commercial ships, or fabricating components of Navy or commercial ships that are being built by other yards. Reorienting the yard into one that focuses on other kinds of work, if feasible, would likely result in workloads, revenues, and employment levels that are significantly reduced from today's.

If NGSS loses the DD(X) competition and other work being done at NG/Ingalls (particularly construction of amphibious ships) does not increase, then NG/Ingalls could similarly experience a reduction in workloads, revenues, and employment lev-

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Abiding by this direction required the Navy to alter its funding profile for the lead DD(X) to one that fully funds the ship in a particular year. The fiscal year 2006–fiscal year 2011 plan suggests that the Navy, after examining its options, selected fiscal year 2007 as the year in which the ship would be fully funded. The actual schedule for building the lead ship, however, may delayed by about a year rather than 2 years. Consequently, although the nominal year of procurement for the lead DD(X) appears to have been deferred 2 years, the actual amount of change in the schedule for the lead ship may be less.

[16] For more on the DD(X) program, see CRS Report RS21059, Navy DD(X) Destroyer Program: Background and Issues for Congress, by Ronald O'Rourke; and CRS Report RL32109, Navy DD(X) and LCS Ship Acquisition Programs: Oversight Issues and Options for Congress, by Ronald O'Rourke.

[17] GD/BIW is also the prime contractor for the GD version of the LCS, but the GD version is to be built by the Austal USA shipyard, of Mobile, AL.

els. The continuation of amphibious-ship construction at NG/Ingalls could make the scenarios of closure and liquidation or mothballing less likely for NG/Ingalls than for GD/BIW, but workloads, revenues, and employment levels could still be reduced from current levels, and the cost of amphibious-ship construction and other work done at NG/Ingalls could increase due to reduced spreading of shipyard fixed overhead costs.

If surface-combatant construction work at GD/BIW or NG/Ingalls ceases, the Navy would be left with one yard actively building larger, complex surface combatants. If the Navy at some point wanted to reestablish a second source for building these ships, its options would include reconstituting surface combatant construction at the yard where the work had ceased, reconstituting it at some other yard with past experience building larger surface combatants—such as NGNN, which built nuclear-powered cruisers in the 1970s, NG/Avondale, which built *Knox* (FF–1052) class frigates in the 1970s and Hamilton (WHEC–715) class Coast Guard cutters in the 1960s and 1970s, or perhaps Todd Pacific Shipyards of Seattle, WA, which built *Oliver Hazard Perry* (FFG–7) class frigates in the 1980s[18]—or establishing it at a yard that has not previously built larger, complex surface combatants, but could be made capable of doing so.

LPD–17 Amphibious Ship Program

San Antonio (LPD–17) class amphibious ships are built by NGSS, particularly NG/Avondale. The fiscal years 2006–2011 plan would end procurement of LPD–17s after procuring the ninth ship in the class in fiscal year 2007. Previous plans had generally called for building a total of 12 LPD–17s through fiscal year 2010.[19] Under the fiscal years 2006–2011 plan, workloads, revenues, and employment levels associated with building LPD–17s would wind down about 3 years earlier than under previous plans. NG/Avondale might be able to compensate for this by beginning to build TAOE(X) resupply ships or MPF(F) ships, but procurement of these ships is not scheduled to start until fiscal year 2009, suggesting that NG/Avondale might experience a dip in workloads, revenues, and employment levels between the winding down of LPD–17 production and the scaling up of TAOE(X) or MPF(F) production. It is not certain, moreover, whether NG/Avondale will participate in building either of these ships.

LHA(R) Amphibious Ship Program

The LHA(R) amphibious assault ship would be built by NGSS, primarily NG/Ingalls. Compared to the fiscal years 2005–2009 plan, the fiscal years 2006–2011 plan would accelerate the procurement of LHA(R) by 1 year, to fiscal year 2007. The fiscal years 2004–2009 shipbuilding plan that the Navy submitted to Congress in February 2003 showed LHA(R) in fiscal year 2007. Accelerating procurement of LHA(R) to fiscal year 2007 can thus be viewed as restoring the year of procurement shown in the plan submitted to Congress in 2003.[20] The acceleration of LHA(R) to fiscal year 2007 would improve NG/Ingalls' ability to shift workers from the previous amphibious assault ship, LHD–8, to LHA(R), and perhaps help NG/Ingalls somewhat in managing the potential consequences of decisions regarding the DD(X) program.

TAKE Auxiliary Cargo Ship Program

Lewis and Clark (TAKE–1) class auxiliary cargo ships are built by GD/NASSCO. Under the fiscal years 2005–2009 plan, the final three ships in the program were to be procured in fiscal year 2006 (two ships) and fiscal year 2007 (one ship). The fiscal years 2006–2011 plan would instead procure these ships at a rate of one per year during the 3-year period fiscal years 2006–2008. As a consequence, employment at the yard associated with building these ships may start to decline around fiscal year 2006 rather than fiscal year 2007, but construction work on these ships would continue for an additional year into the future before ceasing.

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[18] The Navy's FFG–7s were built at GD/BIW, Todd Pacific Shipyards, and Todd Shipyards of San Pedro, CA. The San Pedro yard is now part of Southwest Marine, Inc., which in turn is part of United States Marine Repair, a group of shipyards that focuses on repairing, modernizing, converting, and overhauling nonnuclear-powered ships.

[19] For more on the LPD–17 program, see CRS Report RL32513, Navy-Marine Corps Amphibious and Maritime Prepositioning Ship Programs: Background and Oversight Issues for Congress, by Ronald O'Rourke.

[20] For more on the LHA(R) program, see CRS Report RL32513, Navy-Marine Corps Amphibious and Maritime Prepositioning Ship Programs: Background and Oversight Issues for Congress, by Ronald O'Rourke.

TAOE(X) Replenishment Ship Program

The fiscal years 2005–2009 plan called for procuring the first two TAOE(X) ships in fiscal year 2009. The fiscal years 2006–2011 plan reduces the fiscal year 2009 procurement to one ship. This would appear to reduce the potential of the TAOE(X) program to serve as a new source of work in fiscal year 2009 for yards that may be attempting to compensate at that time for the winding down of other shipbuilding programs.

MPF(F)/MPF(A) Maritime Prepositioning Ship Program

The fiscal years 2005–2009 plan included three MPF-type ships in fiscal year 2009—two MPF(F)s and one MPF(A) (an aviation variant of the MPF(F) design). The fiscal years 2006–2011 plan would reduce MPF-type procurement to one ship in fiscal year 2009.[21] This would similarly appear to reduce the potential of the MPF program to serve as a new source of work in fiscal year 2009 for yards that may be attempting to compensate at that time for the winding down of other shipbuilding programs.

Options For Supporting Shipbuilding Industrial Base

Aircraft Carrier Industrial Base

One option for supporting the aircraft carrier industrial base would be to restore fiscal year 2007 as the year of procurement for CVN–21, which would shorten the gap in production between CVN–77 and CVN–21 and thereby reduce the cost of CVN–21 (and possibly also costs for submarine construction work at NGNN). Restoring fiscal year 2007 as CVN–21's year of procurement might be facilitated by making greater use of incremental funding for CVN–21 than currently planned, by using advance appropriations for CVN–21, by transferring CVN–21's detailed design and non-recurring engineering (DD/NRE) costs to the Navy's research and development account, where they could be incrementally funded, or by using incremental funding or advance appropriations to fund other ships currently planned for fiscal year 2007, such as LHA(R) or the lead DD(X).[22]

Submarine Industrial Base

One option for supporting the design and engineering portion of the submarine industrial base would be to design a new type of submarine. In recent months, two options have emerged for designing and procuring a new type of attack submarine. One option involves designing a non-nuclear-powered submarine equipped with an air-independent propulsion (AIP) system that could be procured in tandem with *Virginia*-class SSNs. The other option involves designing a reduced-cost SSN using new "Tango Bravo" technologies being developed by the Navy that would be procured as a successor to the *Virginia*-class design. Some or all of $600-million fund included in the fiscal years 2006–2011 FYDP for "a future undersea superiority system" could be used to help finance either option.

AIP-Equipped Non-Nuclear-Powered Submarine

The OFT report on potential fleet platform architectures that is discussed later in this testimony proposed a future Navy consisting of several new kinds of ships, including AIP-equipped non-nuclear-powered submarines.[23] AIP-equipped submarines are currently being acquired by certain foreign navies.

An AIP system such as a fuel-cell or closed-cycle diesel engine extends the stationary or low-speed submerged endurance of a non-nuclear-powered submarine. A conventional diesel-electric submarine has a stationary or low-speed submerged endurance of a few days, while an AIP-equipped submarine may have a stationary or low-speed submerged endurance of up to 2 or 3 weeks.

An AIP system does not, however, significantly increase the high-speed submerged endurance of a non-nuclear-powered submarine. A non-nuclear-powered submarine, whether equipped with a conventional diesel-electric propulsion system or an AIP system, has a high-speed submerged endurance of perhaps 1 to 3 hours, a performance limited by the electrical storage capacity of the submarine's batteries, which are exhausted quickly at high speed.

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[21] For more on the MPF(F) program, see CRS Report RL32513, op cit.

[22] For more on the potential use of incremental funding or advance appropriations in Navy ship procurement, see CRS Report RL32776, Navy Ship Procurement: Alternative Funding Approaches—Background and Options for Congress, by Ronald O'Rourke.

[23] See also Christopher J. Castelli, "Defense Department Nudges Navy Toward Developing Diesel Subs," Inside the Navy, March 7, 2005; Dave Ahearn, "Lawmakers Assail Navy Budget, But Eye Non-Nuke Subs," Defense Today, March 3, 2005.

In contrast, a nuclear-powered submarine's submerged endurance, at any speed, tends to be limited by the amount of food that it can carry. In practice, this means that a nuclear-powered submarine can remain submerged for weeks or months at a time, operating at high speeds whenever needed.

AIP submarines could be procured in tandem with *Virginia*-class boats. One possibility, for example, would be to procure one *Virginia*-class boat plus one or more AIP submarines each year.

Reduced-Cost "Tango Bravo" SSN

The *Virginia* class was designed in the early to mid-1990s, using technologies that were available at the time. New technologies that have emerged since that time may now permit the design of a new SSN that is substantially less expensive than the *Virginia*-class design, but equivalent in capability. The Navy and the Defense Advanced Research Projects Agency (DARPA) are now pursuing the development of these technologies under a program called Tango Bravo, a name derived from the initial letters of the term "technology barriers." As described by the Navy,

> Tango Bravo will execute a technology demonstration program to enable design options for a reduced-size submarine with equivalent capability as the *Virginia*-class design. Implicit in this focus is the goal to reduce platform infrastructure and, ultimately, the cost of future design and production. Additionally, reduced platform infrastructure provides the opportunity for greater payload volume.
>
> The intent of this collaborative effort is to overcome selected technology barriers that are judged to have a significant impact on submarine platform infrastructure cost. Specifically, DARPA and the Navy will jointly formulate technical objectives for critical technology demonstrations in (a) shaftless propulsion, (b) external weapons, (c) conformal alternatives to the existing spherical array, (d) technologies that eliminate or substantially simplify existing submarine systems, and (e) automation to reduce crew workload for standard tasks.[24]

Some Navy and industry officials believe that if these technologies are developed, it would be possible to design a new submarine equivalent in capability to the *Virginia* class, but with a procurement cost of perhaps no more than 67 percent of the *Virginia* class, and possibly less. Such a submarine could more easily be procured within available resources at a rate of two per year, which is a rate that the Navy would need to start in fiscal year 2012 or fiscal year 2013, and sustain for a period of about 12 years, to avoid having the SSN force drop below 40 boats.

Consequently, as an alternative to the option of procuring AIP submarines, another option would be to start design work now on a new "Tango Bravo" SSN. The goal of such an effort could be to produce an SSN design with capability equivalent to that of *Virginia* class and a procurement cost that is no more than 67 percent that of the *Virginia* class. The idea of designing a submarine with these features has been discussed by Navy and industry officials. Under this option, *Virginia*-class procurement could continue at one per year until the Tango Bravo submarine was ready for procurement, at which point *Virginia*-class procurement would end, and procurement of the Tango Bravo submarine would begin.

If design work on a Tango Bravo submarine is begun now and pursued in a concerted manner, the first Tango Bravo submarine might be ready for procurement by fiscal year 2011. (Some industry officials believe that under ideal program conditions, the lead ship could be procured earlier than fiscal year 2011; conversely, some Navy officials believe the lead ship might not be ready for procurement until after fiscal year 2011.) If the lead ship is procured in fiscal year 2011, then the procurement rate could be increased to two per year starting in fiscal year 2012 or fiscal year 2013, meeting the time line needed to avoid falling below 40 boats.

Factors To Consider In Assessing Options

In weighing these options against one another, and against the option of simply continuing to procure *Virginia*-class SSNs, potential factors for Congress to consider include cost, capability, technical risk, and effect on the industrial base. Each of these is discussed below.

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[24] Navy information paper on advanced submarine system development provided to CRS by Navy Office of Legislative Affairs, Jan. 21, 2005. For additional discussion of the Tango Bravo program, see Aarti Shah, "Tango Bravo Technology Contract Awards Expected This Spring," Inside the Navy, March 14, 2005; Andrew Koch, "US Navy In Bid To Overhaul Undersea Combat," Jane's Defence Weekly, March 9, 2005: 11; Lolita C. Baldor, "Smaller Subs Could Ride Waves Of The Future," NavyTimes.com, February 4, 2005; Robert A. Hamilton, "Navy, DARPA Seek Smaller Submarines," Seapower, February 2005: 22, 24–25.

Cost. The *Virginia*-class program has a projected total development cost of roughly $4 billion. An AIP submarine or Tango Bravo SSN could similarly require billions of dollars in up-front costs to develop.

The OFT report recommended substituting four AIP-submarines for one *Virginia*-class submarine in each carrier strike group, suggesting that four AIP submarines might be procured for the same cost ($2.4 billion to $3.0 billion in the fiscal years 2006–2011 FYDP) as one *Virginia*-class submarine. This suggests an average unit procurement cost for an AIP submarine of roughly $600 million to $750 million each when procured at a rate of four per year. Although AIP submarines being built by other countries might cost this much to procure, a U.S. Navy AIP submarine might be built to higher capability standards and consequently cost more to procure, possibly reducing the equal-cost ratio of substitution to three to one or possibly something closer two to one. If so, then the annual cost of procuring one *Virginia*-class SSN plus one, two, or perhaps three AIP submarines could be equal to or less than that of procuring two *Virginia*-class boats per year.

If the procurement cost of a Tango Bravo SSN were no more than 67 percent that of a *Virginia*-class boat, then the annual procurement cost of two Tango Bravo SSNs could be equal to no more than 1.33 *Virginia*-class SSNs.

Capability. As a consequence of their very limited high-speed submerged endurance, non-nuclear-powered submarines, even those equipped with AIP systems, are not well suited for submarine missions that require:

- long, completely stealthy transits from home port to the theater of operation,
- submerged periods in the theater of operation lasting more than 2 or 3 weeks, or
- submerged periods in the theater of operation lasting more than a few hours or days that involve moving the submarine at something more than low speed.

With regard to the first of the three points above, the OFT report proposes transporting the AIP submarines into the overseas theater of operations aboard a transport ship.[25] In doing so, the OFT report accepts that the presence of a certain number of U.S. AIP submarines in the theater of operations will become known to others. A potential force-multiplying attribute of having an SSN in a carrier strike group, in contrast, is that the SSN can be detached from the strike group, and redirected to a different theater to perform some other mission, without alerting others to this fact. Opposing forces in the strike group's theater of operations could not be sure that the SSN was not in their own area, and could therefore continue to devote resources to detecting and countering it. This would permit the SSN to achieve military effects in two theaters of operation at the same time—the strike group's theater of operations, and the other theater to which it is sent.

With regard to the second and third points above, the effectiveness of an AIP submarine would depend on what kinds of operations the submarine might need to perform on a day-to-day basis or in conflict situations while operating as part of a forward-deployed carrier strike group.

One risk of a plan to begin procuring AIP submarines while continuing to procure *Virginia*-class submarines at one per year is that financial pressures in future years could lead to a decision to increase procurement of AIP submarines while reducing procurement of *Virginia*-class submarines to something less than one per year. Such a decision would result in a total submarine force with more AIP submarines and fewer SSNs than planned, and consequently with potentially insufficient capability to meet all submarine mission requirements. This possibility is a principal reason why supporters of the U.S. nuclear-powered submarine fleet traditionally have strongly resisted the idea of initiating construction of non-nuclear-powered submarines in this country.

One risk of a plan to shift to procurement of Tango Bravo SSNs is that financial pressures in future years could lead to a decision to limit procurement of Tango Bravo SSNs to one per year. If the Tango Bravo SSN were equivalent in capability to the *Virginia*-class, however, this would produce a U.S. SSN force no less capable than would have resulted if *Virginia*-class procurement were continued at one per year.

Technical Risk. Developing and designing an AIP submarine would entail a certain amount of technical risk, particularly since a non-nuclear-powered combat submarine has not been designed and procured for the U.S. Navy since the 1950s.

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[25] The strategy of transporting the AIP submarines to the theater using transport ships is not mentioned in the 25 report but was explained at a Feb. 18, 2005 meeting between CRS and analysts who contributed to the OFT report.

Developing and designing a Tango Bravo SSN would similarly entail a certain amount of technical risk, particularly with regard to maturing the Tango Bravo technologies and incorporating them into an integrated SSN design. The earlier the target date for procuring the first Tango Bravo SSN, the higher the technical risk might be.

In contrast to either of these options, simply continuing to procure *Virginia*-class SSNs would likely entail substantially less technical risk, unless an attempt were made to incorporate very substantial changes into the *Virginia*-class design, in which case the difference in technical risk compared to the two new-design options might not be as great.

Effect On Industrial Base. Starting design work now on a new submarine could provide nearterm support to the submarine design and engineering portion of the submarine industrial base and thereby help maintain that base.

An AIP submarine could be designed at either GD/EB, NGNN, or a yard that currently does not design submarines for the U.S. Navy, such as NG/Ingalls. NG/Ingalls has been associated with proposals in recent years for building non-nuclear-powered submarines for export to foreign countries such as Taiwan. If design work for an AIP submarine were to be done at GD/EB, NGNN, or both, it would help maintain certain submarine design and engineering skills at one or both of those yards. It would not, however, maintain certain skills at those yards related to the design and engineering of submarine nuclear propulsion plants. If the design were to be done at NG/Ingalls or some other yard, it might not directly support the maintenance of any submarine design and engineering skills at GD/EB or NGNN.

A Tango Bravo SSN could be designed by GD/EB, NGNN, or both, so the potential effect of a Tango Bravo SSN program on the submarine design and engineering base would depend in part on the acquisition strategy pursued for the program. At the yard or yards doing the design work, it would help to maintain various skills related to the design of nuclear-powered submarines, including skills related to the design and engineering of submarine nuclear propulsion plants.

After completing the design of an AIP submarine or Tango Bravo SSN, the submarine design and engineering base could turn to designing the next-generation ballistic missile submarine (SSBN), the lead ship of which might need to be procured around fiscal year 2020. After designing this new SSBN, the design and engineering base could turn back to designing a follow-on attack submarine that would take advantage of technologies even more advanced than those available today. This sequence of three successive submarine design projects could help maintain the submarine design and engineering base for the next 15 or so years.

The potential effect of an AIP submarine procurement program on the construction portion of the submarine industrial base would depend in part on where the submarines would be built. AIP submarines could be built at either GD/EB, NGNN, or a yard that currently does not build submarines, such as NG/Ingalls. If financial pressures in future years lead to a decision to increase procurement of AIP submarines while reducing procurement of *Virginia*-class submarines to something less than one per year, this would benefit the yard building the AIP submarines but reduce *Virginia*-class construction work at GD/EB and NGNN below levels that might have occurred under the option of simply continuing with *Virginia*-class procurement.

A Tango Bravo SSN could be built at either GD/EB, NGNN, or both, so the potential effect of a Tango Bravo SSN program on the submarine construction industrial base would depend in part on the acquisition strategy pursued for the program. If Tango Bravo SSNs were procured at a rate of two per year, this could result in a greater total volume of SSN construction work than might have occurred under the option of simply continuing with *Virginia*-class procurement. Conversely, if financial pressures in future years lead to a decision to limit procurement of Tango Bravo SSNs to one per year, this could result in a lower total volume of SSN construction work than might have occurred under the option of simply continuing with *Virginia*-class procurement.

Surface Combatant Industrial Base

Options for supporting the surface combatant industrial base can be divided into options for supporting the base between now and about fiscal year 2011, and options for supporting the base in fiscal year 2011 and beyond. Options for supporting the surface combatant industrial base between now and fiscal year 2011, many of which could be combined, include the following:

- accelerating procurement of the first one or two DD(X)s by a year;
- procuring additional DD(X)s;
- procuring additional DDG–51s;
- procuring additional LPD–17 or LHA(R) amphibious ships;

- transferring construction of LCSs to these yards;
- modernizing *Ticonderoga* (CG–47) class Aegis cruisers;
- modernizing *Arleigh Burke* (DDG–51) class Aegis destroyers, perhaps more extensively than currently planned by the Navy; and
- accelerating and expanding procurement of large and medium Deepwater cutters for the Coast Guard.

Accelerating procurement of the first one or two DD(X)s might be facilitated by transferring DD(X) DD/NRE costs to the Navy's research and development account, where they could be incrementally funded, or by using incremental funding or advance appropriations for these ships.

The Navy has no requirement for additional DDG–51s, but the last five DDG–51s were arguably procured in part for industrial-base purposes,[26] and if additional DDG–51s were procured, the Navy would find ways to make good use of them.

Procuring additional LHA(R)s during the period fiscal years 2006–2011 might be facilitated by using incremental funding or advance appropriations.

Transferring construction of LCSs to GD/BIW or NG/Ingalls would likely increase the cost of these ships due to the higher overhead costs of these yards compared to the smaller yards where these ships are currently planned to be built. It might also, however, reduce the cost of other work being done at GD/BIW or NG/Ingalls by spreading the fixed overhead costs of these over a broader workload. It might also avoid the risk of the LCS program creating one or more new yards that are highly dependent on Navy shipbuilding work, which could make more complex the task of managing the shipbuilding industrial base.

Options for modernizing DDG–51s more extensively than currently planned by the Navy include making changes to reduce crewing requirements to about 200 people per ship, and lengthening the ships with a plug that would permit an increased payload.

The current Coast Guard Deepwater acquisition program of record calls for procuring 31 to 33 large and medium cutters (six to eight large cutters and 25 medium cutters) over a period of many years at low annual production rates. Some analysts believe that more than 31 to 33 of these cutters will be needed to fully meet the Coast Guard's expanded post-September 11 mission requirements. The RAND Corporation published a report in 2003 stating that the Coast Guard might need as many as 90 of these ships (44 large cutters and 46 medium cutters) to fully meet its post-September 11 mission requirements.[27] Members of Congress and others have expressed interest in accelerating procurement of these cutters and in expanding the total number of cutters to be procured.

In terms of light-ship displacement, four or five large or medium Deepwater cutters would be roughly equivalent to one DD(X). Procuring 4 or 5 of these cutters per year might therefore generate about as much shipyard construction work as 1 DD(X) per year, and procuring 8 or 10 per year might generate about as much shipyard construction work as two DD(X)s per year. Although the skill mix for building Deepwater cutters is somewhat different than the skill mix for building DD(X)s, accelerating and expanding procurement of Deepwater cutters could:

- reduce the Coast Guard's unit procurement costs for these ships by procuring them at more economic annual rates;
- increase Coast Guard capabilities toward post-September 11 requirements more quickly;
- permit the Coast Guard to retire its aging cutters more quickly, thereby eliminating more quickly the high operation and support costs of these cutters; and
- help sustain the Navy's surface combatant industrial base through a program funded in the budget of the Department of Homeland Security (DHS), the Coast Guard's parent department, rather than the Navy or DOD budget.[28]

Options For Fiscal Year 2011 and Beyond

The decision to reduce DD(X) procurement to one ship per year in fiscal years 2007–2011, which appears to have been driven in large part by affordability consid-

[26] The Navy for several years stated that it planned to build a total of 57 DDG–51s. A total of 62 were procured.

[27] John Birkler, et al., The U.S. Coast Guard's Deepwater Force Modernization Plan: Can It Be Accelerated? 27 Will It Meet Changing Security Needs?, RAND, National Security Research Division, MR–3128.0–USCG, Sept. 2003.

[28] For additional discussion of the Deepwater program, see CRS Report RS21019, Coast Guard Deepwater 28 Program: Background and Issues for Congress, by Ronald O'Rourke.

erations, suggests that, unless budget conditions change, the Navy may never be able to afford to procure more than one DD(X) or CG(X) per year.

A procurement rate of one DD(X) or CG(X) per year, if sustained for a period of many years, might not be enough to maintain the cruiser-destroyer force at desired levels.

The prospect of a one-per-year rate might also raise questions about the potential cost effectiveness of the DD(X)/CG(X) effort when measured in terms of average unit acquisition cost, which is the average cost to develop and procure each ship. Given the $10 billion in research and development funding programmed for the DD(X) program, if DD(X)s or CG(X)s are procured at a rate of one per year for 20 or fewer years and the combined number of DD(X)s and CG(X)s is consequently 20 or less, then the average acquisition cost for the DD(X)/CG(X) effort could be more than $3 billion per ship.

Dissatisfaction with a one-per-year procurement rate due to its potential effects on force structure or average unit acquisition cost could lead to a decision at some point to terminate the DD(X)/CG(X) program. If such a decision were made in the near term, the total number of ships that might be built under the program could be as low as one or two. Under this scenario, a single DD(X) might be procured as a technology demonstrator, while a second DD(X) might be procured to give the other shipyard experience in building the design.

Another scenario is that a total of five DD(X)s are procured through fiscal year 2011, as currently planned, but that the CG(X) program is terminated due to concerns about its procurement cost (which may be greater than that of the DD[X]) and questions about the role of the CG(X) in the missile-defense mission. Although the DD(X) has been described by DOD and others as a bridge to CG(X), there is a possibility (some observers say a probability) that industry may cross that bridge only to discover that the CG(X) is no longer waiting at the other end.

If the DD(X)/CG(X) effort is terminated at some point and an alternative large surface combatant design is not ready to be put into procurement, it could place pressures on the surface combatant industrial base that are significantly higher than those it currently faces under the Navy's fiscal years 2006–2011 plan for procuring DD(X)s, with consequences that could be more severe.

One option for addressing this situation would be to begin design work now on a new surface combatant that is substantially less expensive to procure than the DD(X)/CG(X). Such a surface combatant could be more easily procured within available resources at a rate of two ships per year, which might maintain the cruiser-destroyer force at a level closer to what the Navy may be planning. A rate of two ships per year might also be easier to divide between two shipyards while still constraining production costs. This option could aim at having the new design ready for procurement in fiscal year 2011, which is when CG(X) procurement is currently scheduled to begin.

Notional options for a less-expensive surface combatant include:

- A roughly 9,000-ton surface combatant;
- A roughly 6,000-ton frigate; and
- A low-cost gunfire support ship.

Each of these is discussed below. An additional option to consider, even though it might not be less expensive in terms of unit procurement cost, is the 57,000-ton missile-and-rocket ship proposed in the OFT report on alternative fleet platform architectures.

Roughly 9,000-Ton Surface Combatant (SC(X)). One option for a smaller, less expensive, new-design ship would be a new-technology surface combatant about equal in size to the Navy's current 9,000-ton Aegis cruisers and destroyers. Such a ship, which might be called the SC(X) (meaning surface combatant, in development) could:

- be intended as a replacement for either the CG(X) program or both the DD(X) and CG(X) programs;
- incorporate many of the same technologies now being developed for the DD(X) and CG(X), including, for example, technologies permitting a reduced-sized crew and integrated electric-drive propulsion;
- cost substantially less to procure than a DD(X) or CG(X), and perhaps about as much to procure as a DDG–51 destroyer;
- be similar to the DD(X) and CG(X) in terms of using a reduced-size crew to achieve annual operation and support costs that are considerably less than those of the current DDG–51 design;
- carry a payload—a combination of sensors, weapon launchers, weapons, and aircraft—that is smaller than that of the DD(X) or CG(X), but comparable to that of current DDG–51s or Aegis cruisers.

A land-attack oriented version of the SC(X) might be able to carry one Advanced Gun System (AGS), as opposed to the two on the DD(X). An air- and missile-defense version of the SC(X) might have fewer missile tubes than CG(X), but still a fairly substantial number.

Roughly 6,000-Ton Frigate (FFG(X)). A second option for a smaller, less expensive, newdesign ship would be a frigate intended as a replacement for both the DD(X)/CG(X) effort and the LCS program. The option for a new-design frigate was outlined in a March 2003 Congressional Budget Office (CBO) report on surface combatants and CBO's February 2005 report on options for the fiscal year 2006 Federal budget.[29] CBO estimates that such a ship, which it called the FFG(X), might displace about 6,000 tons and have a unit procurement cost of about $800 million.

A 6,000-ton FFG(X) would likely be too small to be equipped with the AGS and therefore likely could not provide the additional naval gunfire capability that would be provided by the DD(X). A 6,000-ton FFG(X) might, however, be capable of performing the non-gunfire missions that would be performed by both the DD(X) and the LCS. A 6,000-ton FFG(X) would could be viewed as a replacement in the surface combatant force structure for the Navy's *Oliver Hazard Perry* (FFG–7) class frigates and *Spruance* (DD–963) class destroyers. Since a 6,000-ton FFG(X) would be roughly midway in size between the 4,000-ton FFG–7 design and the 9,000-ton DD–963 design, it might be suitable for carrying more modern versions of the mission equipment currently carried by the FFG–7s and DD–963s.

Low-Cost Gunfire Support Ship. A third option for a smaller, less expensive, newdesign ship would be a low-cost gunfire support ship—a relatively simple ship equipped with one or two AGSs and only such other equipment that is needed for basic ship operation. Other than the AGSs and perhaps some advanced technologies for reducing crew size and thus total life-cycle cost, such a ship could use existing rather than advanced technologies so as to minimize development time, development cost, and technical risk. Some of these ships might be forward-stationed at sites such as Guam or Diego Garcia, so as to be available for rapid crewing and movement to potential contingencies in the Western Pacific or Indian Ocean/Persian Gulf regions. The goal would be to procure specialized AGS-armed ships as a niche capability for the Navy, and then forward-station some of that capability so as to maximize the odds of being able to bring a desired number of AGSs to an overseas theater of operation in a timely manner on those occasions when needed.

INDEPENDENT STUDIES ON FLEET ARCHITECTURE[30]

Origin of Studies

Section 216 of the conference report (H.Rept. 108–354 of November 7, 2003) on the National Defense Authorization Bill for Fiscal Year 2004 (H.R. 1588/P.L. 108–136 of November 24, 2003) required the Secretary of Defense to provide for two independently performed studies on potential future fleet platform architectures (i.e., potential force structure plans) for the Navy. Subsection (d) of section 216 stated in part that "The results of each study under this section shall—(1) present the alternative fleet platform architectures considered, with assumptions and possible scenarios identified for each. . . ."[31]

The two studies required by Section 216 were conducted by the Center for Naval Analyses (CNA) and the Office of Force Transformation (OFT) and were submitted to the congressional defense committees in February 2005.

A third independent study on potential future fleet platform architectures was conducted by the Center for Strategic and Budgetary Assessments (CSBA). CSBA conducted this study on its own initiative and made it available to congressional and other audiences in March 2005 as an alternative to the CNA and OFT studies.

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[29] U.S. Congressional Budget Office, Transforming the Navy's Surface Combatant Force, Mar. 2003, pp. 29 27–28, 63; and U.S. Congressional Budget Office, Budget Options, Feb. 2005, pp. 18–19.

[30] This section includes some material adapted with permission from a March 18, 2005 memorandum to the office of Representative Roscoe Bartlett.

[31] Section 216 is an amended version of a provision (Section 217) in the House-reported version of H.R. 1588. See pages 28–29 and 612–613 of H.Rept. 108–354, and pages 255–256 of the House report (H.Rept. 108–106 of May 16, 2003) on H.R. 1588.

Force Structure Recommendations

CNA Report[32]

The CNA report uses essentially the same kinds of ships and naval formations as those planned by the Navy. The report recommends a Navy force structure range of 256 to 380 ships. The low end of the range assumes a greater use of crew rotation and overseas homeporting of Navy ships than the high end. Table 2 compares the CNA-recommended force range to the Navy's 375-ship fleet proposal of 2002–2004 and the notional 260- and 325-ship fleets for fiscal year 2035 presented in the Navy's March 2005 interim report to Congress.

TABLE 2. CNA—RECOMMENDED FORCE AND OTHER PROPOSALS

Ship type	CNA force range Navy	375-ship proposal of 2002–2004[1]	Notional Navy fleets for fiscal year 2035	
			260 ships	325 ships
Ballistic missile submarines (SSBNs)	14	14	14	14
Cruise missile submarines (SSGNs)	4	4	4	4
Attack submarines (SSNs)	38 to 62	52	37	41
Aircraft carriers	10 to 12	12	10	11
Cruisers and destroyers	66 to 112	109	67	92
Littoral combat ships (LCSs)	40 to 70	56	63	82
Amphibious ships	18 to 30	36	17	24
Maritime Prepositioning Force (Future) ships	19 to 21	18	14	20
Combat logistics (resupply) ships	25 to 33	33	24	26
Other[2]	22	41	10	11
Total battle force ships	256 to 380	375	260	325

Source: Table prepared by CRS based on CNA report and March 2005 Navy report.

[1] Composition as shown in CNA report as the program of record for 2022. An earlier and somewhat different composition is shown in CRS Report RL32665.

[2] Includes command ships, support ships (such as salvage ships and submarine tenders), dedicated mine warfare ships, and sea basing connector ships.

OFT Report

The OFT report[33] employs eight new ship designs that differ substantially from the designs of most ships currently in the fleet, under construction, or planned for procurement. Among the eight new ship designs are four types of large surface ships that would be built from a common, relatively inexpensive, merchant-like hull design developed in 2004 for the Navy's Maritime Prepositioning Force (Future) analysis of alternatives. These four types of ships, which would all displace 57,000 tons, include:

- An aircraft carrier that would embark a notional air wing of 30 Joint Strike Fighters (JSFs), 6 MV–22 Osprey tilt-rotor aircraft, and 15 unmanned air vehicles (UAVs). The total of 36 manned aircraft is about half as many as in today's carrier air wings, and the OFT architecture envisages substituting two of these new carriers for each of today's carriers. This new carrier would also have support spaces for unmanned underwater vehicles (UUVs), unmanned surface vehicles (USVs), and mission modules for the 1,000-ton surface combatant described below.
- A missile-and-rocket ship that would be equipped with 360 vertical launch system (VLS) missile tubes and four trainable rocket launchers. Additional spaces on this ship could be used to support UUVs, USVs, and mission modules for the 1,000-ton surface combatant. Alternatively, these spaces could be used to provide limited stowage and working space for the 100-ton surface combatant described below, and mission modules for these 100-ton ships.
- An amphibious assault ship that would embark a notional air wing of either 30 CH–46 equivalents or 6 JSFs, 18 MV–22s, and 3 gyrocopter heavy-lift helicopters. It would also have spaces for Marine Corps equipment, unmanned vehicles, and mission modules for the 1,000-ton surface combatant.

[32] Delwyn Gilmore, with contributions by Mark Lewellyn et al, Report to Congress Regarding Naval Force Architecture. Alexandria (VA), Center for Naval Analyses, 2005. (CRM D0011303.A2/1Rev, Jan. 2005) 60 pp. (Hereafter CNA report.)

[33] U.S. Department of Defense, Office of the Secretary of Defense, Alternative Fleet Architecture Design. 33 Washington, 2005. (Report for the Congressional Defense Committees, Office of Force Transformation). 101 pp. (Hereafter OFT report.)

• A "mother ship" for small combatants that would contain stowage and support spaces for the 100-ton surface combatant described below.

The four other new-design ships in the OFT architecture are:

• A 13,500-ton aircraft carrier based on a conceptual surface effect ship (SES)/catamaran hull design developed in 2001 by a team at the Naval Postgraduate School. This ship would embark a notional air wing of 8 JSFs, 2 MV–22s, and 8 UAVs. The total of 10 manned aircraft is roughly one-eighth as many as in today's carrier air wings, and the OFT architecture envisages substituting eight of these new carriers for each of today's carriers. This new ship would have a maximum speed of 50 to 60 knots.

• A 1,000-ton surface combatant with a maximum speed of 40 to 50 knots and standard interfaces for accepting various modular mission packages. These ships would self-deploy to the theater and would be supported in theater by one or more of the 57,000-ton ships described above.

• A 100-ton surface combatant with a maximum speed of 60 knots and standard interfaces for accepting various modular mission packages. These ships would be transported to the theater by the 57,000-ton mother ship and would be supported in theater by that ship and possibly also the 57,000-ton missile-and-rocket ship.

• A non-nuclear-powered submarine equipped with an air-independent propulsion (AIP) system. These AIP submarines would be lower-cost supplements to the Navy's nuclear-powered submarines (SSNs) and would be transported from home port to the theater of operations by transport ships. The OFT architecture envisages substituting four of these submarines for the SSN in each carrier strike group.[34]

The 1,000- and 100-ton surface combatants would be built as relatively inexpensive sea frames, like the LCS.

The OFT report combines these eight types of ships, plus the Navy's currently planned TAOE-class resupply ship, into a fleet that would include a much larger total number of ships than planned by the Navy, about the same number of carrier-based aircraft as planned by the Navy, and large numbers of unmanned systems. The OFT report presents three alternative versions of this fleet, which the report calls Alternatives A, B, and C. The report calculates that each of these alternatives would be equal in cost to the equivalent parts of the Navy's 375-ship proposal. Each of these alternative force structures, like the equivalent parts of the Navy's 375-ship proposal, would be organized into 12 carrier strike groups (CSGs), 12 expeditionary strike groups (ESGs), and 9 surface strike groups (SSGs). The three alternative force structures are shown in Table 3 below.

TABLE 3. ALTERNATIVE FLEET STRUCTURES FROM OFT REPORT

Ship type	Alternative		
	A	B	C
57,000-ton aircraft carrier	24	24	0
57,000-ton missile-and-rocket ship	33	33	33
57,000-ton amphibious assault ship	24	24	24
57,000-ton mother ship	0	24	24
13,500-ton aircraft carrier	0	0	96
1,000-ton surface combatant	417	0	0
100-ton surface combatant	0	609	609
AIP submarine	48	48	48
TAOE-class resupply ship	12	12	12
Subtotal 1,000- and 100-ton ships	417	609	609
Subtotal other ships	141	165	237

[34] The report states that "Alternatives to the SSNs in formations were diesel Air Independent Propulsion (AIP) submarines and unmanned undersea vehicles (UUVs). The AIP submarines were substituted for *Virginia* class SSNs on a cost basis of roughly four to one. These submarines could be nuclear-powered if they are designed and built based upon a competitive, cost suppressing business model." (Page 60) The strategy of transporting the AIP submarines to the theater using transport ships is not mentioned in the report but was explained at a February 18, 2005 meeting between CRS and analysts who contributed to the OFT report.

TABLE 3. ALTERNATIVE FLEET STRUCTURES FROM OFT REPORT—Continued

Ship type	Alternative		
	A	B	C
Total ships [1]	558	774	846

Source: Table prepared by CRS based on figures in OFT report.
[1] The totals shown in early copies of the OFT report are 36 ships lower in each case due to an error in those copies in calculating the numbers of ships in the 12 carrier strike groups.

The totals shown in the table do not include SSNs, cruise missile submarines (SSGNs), and ballistic missile submarines (SSBNs) operating independently of the 12 CSGs, 12 ESGs, and 9 SSGs. The totals also do not include combat logistics ships other than the TAOEs (e.g., oilers, ammunition ships, and general stores ships) and fleet support ships. The Navy's 375-ship proposal, by comparison, includes all these kinds of ships.

As can be seen from the shaded cells in the table, the difference between Alternatives A and B is that the former uses 1,000-ton surface combatants while the latter uses 100-ton surface combatants that are transported into the theater by mother ships, and the difference between Alternatives B and C is that the former uses 57,000-ton aircraft carriers while the latter substitutes 13,500-ton carriers.

CSBA Report

The CSBA report [35] uses many of the same ship designs currently planned by the Navy, but also proposes some new ship designs. The CSBA report also proposes ship formations that in some cases are different than those planned by the Navy. Table 4 below compares the CSBA-recommended force structure to CNA's recommended force range, the Navy's 375-ship fleet proposal of 2002–2004, and the notional 260- and 325-ship fleets for fiscal year 2035 presented in the Navy's March 2005 interim report to Congress.

TABLE 4. CSBA—RECOMMENDED FORCE AND OTHER PROPOSALS

Ship type	CSBA force	CNA force range	Navy 375-ship proposal of 2002–2004 [a]	Notional Navy fleets for Fiscal Year 2035	
				260 ships	325 ships
Ballistic missile submarines (SSBNs)	12 [b]	14	14	14	14
Cruise missile submarines (SSGNs)	6 [b]	4	4	4	4
Attack submarines (SSNs)	54 [c]	38 to 62	52	37	41
Large-deck aircraft carriers (CVNs)	10	10 to 12	12	10	11
Medium aircraft carriers (CVEs)	4	0	0	0	0
Afloat forward staging base (AFSB)	1	0	0	0	0
Cruisers and destroyers	84 or 86	66 to 112	109	67	92
Littoral combat ships (LCSs)	84	40 to 70	56	63	82
Amphibious ships	32 [d]	18 to 30	36	17	24
Maritime Prepositioning Force ships	16 [e]	19 to 21 [e]	18 [e]	14 [e]	20 [e]
Combat logistics (resupply) ships	36 [f]	25 to 33	33	24	26
Other [g]	34 [h]	22	41	10	11
Total battle force ships	373 or 375 [i]	256 to 380	375	260	325

Source: Table prepared by CRS based on CSBA report, CNA report, and March 2005 Navy report.
[a] Composition as shown in CNA report as the program of record for 2022. An earlier and somewhat different composition is shown in CRS Report RL32665.
[b] Alternatively, 10 SSBNs and 8 SSGNs.
[c] Includes one special-mission submarine. Total number drops slightly over next 12 years.
[d] Includes 8 LHDs and 24 LPD–17s.
[d] In the CSBA force, these are existing MPF ships; in the other fleets, they are MPF(Future) ships.
[f] Includes 8 TAOEs, 11 TAKEs, and 17 TAOs.
[g] Includes command ships, and support ships (such as salvage ships and submarine tenders), dedicated mine warfare ships, and sea basing connector ships.
[h] Includes, among other ships, two TAVBs and eight TLKAs associated with the amphibious and MPF ships.
[i] In addition to these ships, the CSBA report notes that U.S. maritime forces would include 35 DOD prepositioning and surge sealift ships used primarily by the Army and Air Force, and 91 large, medium, and fast-response (i.e., small) cutters planned for procurement under the Coast Guard Deepwater acquisition program.

[35] Robert O. Work, Winning the Race: A Naval Fleet Platform Architecture for Enduring Maritime Supremacy. Washington, Center for Strategic and Budgetary Assessments, 2005. (Version as of March 1, 2005, which is in the form of a slide briefing with 322 slides. Hereafter CSBA report.)

The CSBA report makes numerous specific recommendations for ship force structure and ship acquisition, including the following:

- Aircraft carriers. When the George H.W. Bush (CVN–77) enters service in 2008 or 2009, do the following:
  - Retire the two remaining conventional carriers—the *Kitty Hawk* (CV–63) and the *Kennedy* (CV–67).
  - Convert the *Enterprise* (CVN–65) into an afloat forward staging base (AFSB) with a mixed Active/Reserve/civilian crew, to be used in peacetime for aviation testing and in crises for embarking Special Operations Forces, Army or Marine Corps Forces, or Joint Air Wings.
  - Begin replacing the 10 *Nimitz* (CVN–68) class carriers on a one-for-one basis with CVN–21-class carriers procured once every 5 years using incremental funding.
  - Redesignate the LHA(R) as a medium sized carrier (CVE) and procure one every 3 years starting in fiscal year 2007 using incremental funding.[36]
- Submarines.
  - Maintain *Virginia*-class SSN procurement at one per year for the next several years, producing an eventual total of perhaps 20 *Virginia*-class boats.
  - Begin immediately to design a new "undersea superiority system" with a procurement cost 50 percent to 67 percent that of the *Virginia*-class design, with the goal of achieving a procurement rate of two or three of these boats per year no later than fiscal year 2019.
  - Study options for extending the service lives of the three *Seawolf* SSNs and the 31 final *Los Angeles*-class SSNs to mitigate the projected drop in SSN force levels during the 2020s.
  - Reduce the SSBN force from 14 ships to 12 ships and convert an additional 2 SSBNs into SSGNs, for a total of 6 SSGNs.
  - Study the option of reducing the SSBN force further, to 10 ships, which would permit another 2 SSBNs to be converted into SSGNs, for a total of 8 SSGNs.[37]
- Destroyers and cruisers.
  - Procure a single DD(X) in fiscal year 2007, using research and development funding, as the first of three surface combatant technology demonstrators.
  - Start a design competition for a next generation, modular surface combatant or family of combatants, with capabilities equal to or greater than the DD(X)/CG(X), but with a substantially lower procurement cost.
  - Build two additional surface combatant technology demonstrators to compete against the DD(X) design.
  - Use the results of this competition to inform the design of a new surface combatant, called SCX, with a procurement cost perhaps one-third to one-half that of the DD(X).
  - Begin procuring this new design in fiscal year 2015 as a replacement for the DD(X)/CG(X) program.
  - Consider modifying the LPD–17 design into a low-cost naval surface fire support ship carrying the Advanced Gun System (AGS) that was to be carried by the DD(X).
  - Consider procuring two additional DDG–51s to help support the surface combatant industrial base in the near-term.[38]
- Littoral Combat Ships and Coast Guard Deepwater cutters.
  - Procure six LCSs per year for a total of 84 LCSs—42 of the Lockheed design, and 42 of the General Dynamics design.
  - Organize these 84 ships into 42 divisions, each consisting of one Lockheed ship and one General Dynamics ship, so that each division can benefit from the complementary strengths of the two designs.

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[36] CSBA report, slides 154–158.

[37] CSBA report, slides 276, 284, 289, 297, 299.

[38] CSBA report, slides 246, 249, and 251–253. Slide 249 states that possibilities for a reduced-cost alternative to the DD(X) include a surface combatant based on the LPD–17 design, a semi-submersible ship built to commercial standards (like a ship called the "Stryker" that was proposed several years ago), and a large or medium "carrier of large objects," perhaps built to relaxed commercial standards.

- Ensure that mission packages for the LCS and mission packages for the Coast Guard's large and medium Deepwater cutters are as mutually compatible as possible.
- Include the Coast Guard's Deepwater cutters when counting ships that contribute to the country's total fleet battle network.
- Begin a research and development and experimentation program aimed at building several competing stealth surface combatant technology demonstrators for operations in contested or denied-access waters.[39]

- Amphibious ships.
  - Complete LHD–8 to create a force of eight LHDs.
  - Rather than stopping procurement of LPD–17s after the ninth ship in fiscal year 2007, as now planned by the Navy, increase the LPD–17 procurement rate to two ships per year and use multiyear procurement (MYP) to procure a total of 24 LPD–17s.
  - Retire the 12 existing LSD–41/49 class ships, leaving a 32-ship amphibious fleet consisting of eight LHDs and 24 LPD–17s.
  - Form eight "distributed expeditionary strike bases"—each of which would include one LHD, three LPD–17s, one Aegis cruiser, three Aegis destroyers, two LCSs, and one SSGN.[40]
- MPF and other ships.
  - Retain the three existing MPF squadrons over the near- to mid-term.
  - Reconfigure two of the squadrons for irregular warfare.
  - Use the third squadron as a swing asset to either reinforce the two irregular-warfare squadrons or to provide lift for assault follow-on echelon amphibious landing forces.
  - Develop high-speed intra-theater and ship-to-shore surface connectors.
  - Design an attack cargo ship (TAKA) to help support sustained joint operations ashore, with a target unit procurement cost of $500 million or less, and begin procuring this ship in fiscal year 2014.
  - Replace the two existing hospital ships, the four existing command ships, and existing support tenders with new ships based on the LPD–17 design.
  - Initiate a joint experimental program for future sea-basing platforms and technologies.[41]

The CSBA report raises several questions about the Navy's emerging sea basing concept for conducting expeditionary operations ashore. The report states:

> The work done thus far on sea basing is intriguing, but neither the concept nor the supporting technologies appear sufficiently mature to justify any near-term decisions such as canceling LPD–17 [procurement] in favor of MPF(F) ships, or removing the well deck from the big deck amphibious assault platforms, both of which would severely curtail the [fleet's] ability to launch surface assaults over the longer term.
>
> Given these large uncertainties, no major moves toward the sea basing vision should be made without further exploring the sea basing concept itself, and experimenting with different numbers and types of sea base platforms, connectors, and capabilities.[42]

Observations

Observations about the CNA, OFT, and CSBA reports can be made on several points, including the following:

- organizations and authors;
- analytical approach;
- use of prospective ship-procurement funding levels as a force-planning consideration;
- fleet size and structure;
- whether the recommended force qualifies as an alternative fleet architecture;
- fleet capability;
- transition risks; and
- implications for the industrial base.

Each of these is discussed below.

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[39] CSBA report, slides 275, 277, and 283.
[40] CSBA report, slides 227 and 236.
[41] CSBA report, slides 228–232, and 307.
[42] CSBA report, slide 212.

Organizations and Authors

CNA Report. CNA is a federally funded research and development center (FFRDC) that does much of its analytical at the Navy's request. The CNA report's discussion of how crew rotation may alter force-level requirements for maintaining day-to-day forward deployments is somewhat detailed and may have been adapted from other work that CNA has done on the topic for the Navy.

OFT Report. The OFT report was prepared under the direction of retired Navy admiral Arthur Cebrowski, who was the director of OFT from October 29, 2001 until January 31, 2005 and the President of the Naval War College (NWC) from July 24, 1998 to August 22, 2001. During his time at NWC and OFT, Cebrowski was a leading proponent of network-centric warfare and distributed force architectures.

CSBA Report. The CSBA report was prepared by Robert Work, CSBA's analyst for maritime issues. CSBA describes itself as "an independent, policy research institute established to promote innovative thinking about defense planning and investment strategies for the 21st century. CSBA's analytic-based research makes clear the inextricable link between defense strategies and budgets in fostering a more effective and efficient defense, and the need to transform the U.S. military in light of an emerging military revolution."[43] CSBA's Executive Director is Dr. Andrew F. Krepinevich, Jr., whose previous experience includes work in DOD's Office of Net Assessment, the office directed by Andrew Marshall. Krepinevich is generally considered a major writer on defense transformation.

Analytical Approach

CNA Report. The CNA report grounds its analysis in traditional DOD force-planning considerations and campaign modeling. The report cites past DOD force-planning studies that reflect similar approaches. The implicit argument in the CNA report is that its findings have weight in part because they reflect a well-established and systematic approach to the problem.

OFT Report. In contrast to the CNA report, the OFT report "calls into question the viability of the longstanding logic of naval force building."[44] The OFT report grounds its analysis in four major force-design principles that the report identifies as responsive to future strategic challenges and technological opportunities.[45] The report then seeks to design a fleet that it is consistent with these principles, and assesses that fleet using a new set of metrics that the report believes to be consistent with these principles. The implicit argument in the OFT report is that its findings have weight in part because they reflect major force-design principles that respond to future strategic challenges and technological opportunities.

CSBA Report. The CSBA report employs an extensive historical analysis of the missions and structure of the U.S. Navy and other navies. The report argues that the structure of the U.S. Navy has shifted over time in response to changes in technology and U.S. security challenges, and that U.S. Military forces have entered a new security era (which the report calls the "Joint Expeditionary Era") during which the U.S. Navy will need to do three things.[46] To do these three things, the report argues, the Navy should be structured to include four different force elements.[47] The report constructs these four force elements and then combines them to arrive at an overall recommended Navy force structure. The implicit argument in the CSBA report is that its findings have weight in part because they reflect insights about future missions and force requirements gained through careful historical analysis of the missions and structure of the U.S. Navy and other navies.

Prospective Ship-Procurement Funding Levels As A Consideration

CNA Report. The CNA report aims at designing a cost-effective fleet. It also mentions cost estimates relating to the option of homeporting additional attack submarines at Guam.[48] Prospective ship-procurement funding levels, however, are not prominently featured in the CNA report as a force-planning consideration.

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[43] Source: CSBA's website [http://www.csbaonline.org].

[44] OFT report, p. 1

[45] The principles are complexity, smaller ships and improved payload fraction, network-centric warfare, and modularity.

[46] These three things are: (1) contribute to the global war on terrorism; (2) prepare for possible nuclear-armed regional competitors; and (3) hedge against the possibility of a disruptive maritime competition with China.

[47] These four force elements are: (1) a sea-based power-projection and regional deterrence force; (2) a global patrol, global war on terrorism, and homeland defense force; (3) a force for prevailing over enemy anti-access/area-denial forces; and (4) a strategic deterrence and dissuasion force.

[48] CNA Report, p. 36.

OFT Report. Prospective ship-procurement funding levels are a significant force-planning consideration in the OFT report. The report argues that an important metric for assessing a proposed fleet architecture is the ease or difficulty with which it can be scaled up or down to adapt to changes in ship-procurement funding levels.

The OFT report contains a fairly detailed discussion of the Navy's budget situation that calls into question, on several grounds, the Navy's prospective ability to afford its 375-ship proposal. The report concludes that funding for Navy ship-procurement in future years may fall as much as 40 percent short of what would be needed to achieve the Navy's 375-ship fleet proposal. If the shortfall is 40 percent, the report estimates, the Navy could maintain a force of 270 to 315 ships, which is comparable in number to today's force of 288 ships, except that the future force would include a substantial number of relatively inexpensive LCSs. If proportionate reductions are applied to the OFT fleets shown in Table 3, Alternative A would include 402 to 469 ships, Alternative B would include 557 to 650 ships, and Alternative C would include 609 to 711 ships. Again, these totals would not include certain kinds of ships (independently operating SSNs, etc.) that are included in the total of 270 to 315 ships associated with the Navy's currently planned architecture.

CSBA Report. As with the OFT report, prospective ship-procurement funding levels are a significant force-planning consideration in the CSBA report. The CSBA report estimates that in future years, the Navy may have an average of about $10 billion per year in ship-acquisition funding. The report then aims at designing a force whose ships could be acquired for this average annual amount of funding.

Fleet Size and Structure

CNA Report. The 380-ship fleet at the high end of the CNA range is similar in size and composition to the Navy's 375-ship fleet proposal. The 256-ship fleet at the low end of the CNA range is similar in size and composition to the Navy's 260-ship fleet for fiscal year 2035, except that the 260-ship fleet has more LCSs and fewer ships in the "other ships" category.[49]

OFT Report. The OFT-recommended fleet would have a much larger total number of ships than the Navy's planned fleet. The OFT fleet would also feature a much larger share of small combatants. Of the ships shown in Table 3, the small combatants account for about 75 percent in Alternative A, about 79 percent in Alternative B, and about 72 percent in Alternative C. (Adding into the mix SSNs and other kinds of ships not shown in Table 3 would reduce these percentages somewhat.) In the Navy's notional 260- and 325-ship fleets, by contrast, LCSs account for about 25 percent of the total number of ships.

The OFT architecture is similar in certain ways to a fleet architecture proposed by the Naval Surface Warfare Center (NSWC) between 1989 and 1992 and sometimes referred to as the Carrier of Large Objects (CLO) proposal. The NSWC architecture, like the OFT architecture, employed a common hull design for a large ship that could be built in several variants for various missions, including aviation, missile launching and fire support, amphibious warfare, logistics support, and mothership support of small, fast, surface combatants. The small, fast surface combatants in the NSWC architecture were called scout fighters and were in the same general size range as the 100- and 1,000-ton surface combatants in the OFT architecture.[50]

CSBA Report. The CSBA force would have about the same total number of ships as the Navy's 375-ship fleet proposal. CSBA's subtotals for some ship categories are similar to subtotals in one or more of the other fleet proposals shown in Table 4. Significant differences between the CSBA proposal and the other fleet proposals shown in Table 4 include:

- the four medium-sized aircraft carriers (CVEs);

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[49] Additional points of comparison: The CNA range of 256 to 380 ships overlaps with potential ranges of 290 to 375 ships, 260 to 325 ships, and 243 to 302 ships presented in the Navy's February 2005 testimony to Congress. The mid-point of the CNA-recommended range (318 ships) is similar in terms of total numbers of ships to the 310-ship fleet from the 2001 Quadrennial Defense Review (QDR). Unlike the 2001 QDR fleet, however, the CNA-recommended force includes several dozen Littoral Combat Ships (LCSs) and smaller numbers of other kinds of ships.

[50] For more on this proposed fleet architecture, see Norman Polmar, "Carrying Large Objects," U.S. Naval Institute Proceedings, December 1990: 121–122; Michael L. Bosworth et al, "Multimission Ship Design for an Alternative Fleet Concept," Naval Engineers Journal, May 1991: 91–106; Michael L. Bosworth, "Fleet Versatility by Distributed Aviation," U.S. Naval Institute Proceedings, Jan. 1992: 99–102; and Victor A. Meyer, "Naval Surface Warfighting Vision 2030," Naval Engineers Journal, May 1992: 74–88. See also "USN's '2030' Plan For Future Fleet," Sea Power, Apr. 1992: 79, 82; Edward J. Walsh, "'Alternative Battle Force' Stresses Commonality, Capability," Sea Power, Feb. 1991: 33–35; Robert Holzer, "Navy Floats Revolutionary Ship Design for Future Fleet," Defense News, May 14, 1990: 4, 52; and Anne Rumsey, "Navy Plans Ship Look-A-Likes," Defense Week, Mar. 13, 1989: 3.

- the conversion of a carrier into an afloat forward staging base;
- the composition of the cruiser-destroyer force (which would include SCXs rather than DD(X)s and CG(X)s);
- the composition of the amphibious fleet (which would have additional LPD–17s in lieu of today's LSD–41/49s); and
- the composition of the maritime prepositioning force (which would continue to include, for a time at least, today's MPF ships rather than the Navy's planned MPF(F) ships).

Does It Qualify As An Alternative Force Architecture?

CNA Report. As mentioned earlier, the CNA report uses essentially the same kinds of ships and naval formations as those planned by the Navy. If an alternative fleet platform architecture is defined as one that uses ship types or naval formations that differ in some significant way from those currently used or planned, then the CNA-recommended force arguably would not qualify as an alternative fleet platform architecture.

OFT Report. Since the OFT report proposes building ships that are substantially different from those currently planned, and combines these ships into formations which, although similar in name to currently planned formations (i.e., CSGs, ESGs, and SSGs), might be viewed by some observers as substantially different in composition from the currently planned versions of these formations, the OFT-recommended force arguably would qualify as an alternative fleet platform architecture.

CSBA Report. Since the CSBA report proposes building ships that in some cases are different from those currently planned, and combines these ships into formations that in some cases are different in composition from those currently planned, the CSBA-recommended force arguably would qualify as an alternative fleet platform architecture, though less dramatically so than the OFT-recommended force.

New Ship Designs

CNA Report. The CNA report does not propose any ship designs other than those already planned by the Navy.

OFT Report. The 57,000-ton aircraft carrier in the OFT report would be roughly the same size as the United Kingdom's new aircraft carrier design, and somewhat larger than the U.S. Navy's 40,000-ton LHA/LHD-type amphibious assault ships. Compared to the U.S. Navy's aircraft carriers, which displace 81,000 to 102,000 tons, this ship could be considered a medium-size carrier.

The 57,000-ton missile-and-rocket ship in the OFT report could be considered similar in some respects to the Navy/DARPA arsenal ship concept of 1996–1997, which would have been a large, relatively simple surface ship equipped with about 500 VLS tubes.[51]

The 13,500-ton aircraft carrier in the OFT report would be slightly larger than Thailand's aircraft carrier, which was commissioned in 1997, and somewhat smaller than Spain's aircraft carrier, which was based on a U.S. design and was commissioned in 1988. Due to its SES/catamaran hull design, this 13,500-ton ship would be much faster than the Thai and Spanish carriers (or any other aircraft carrier now in operation), and might have a larger flight deck. This ship could be considered a small, high-speed aircraft carrier.

The 1,000- and 100-ton surface combatants in the OFT report could be viewed as similar to, but smaller than, the 2,500- to 3,000-ton Littoral Combat Ship (LCS). Compared to the LCS, they would be closer in size to the Streetfighter concept (a precursor to the LCS that was proposed by retired admiral Cebrowski during his time at the Naval War College).

The AIP submarine in the OFT report could be similar to AIP submarines currently being developed and acquired by a some foreign navies.

CSBA Report. The proposal in the CSBA report for an afloat forward staging base (AFSB) is similar to other proposals for AFSBs that have been reported in recent years, though other proposals have suggested using commercial ships or military sealift ships rather than converted aircraft carriers as the basis for the AFSB.[52]

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[51] For more on the arsenal ship, see CRS Report 97–455 F, Navy/DARPA Arsenal Ship Program: Issues and Options for Congress, by Ronald O'Rourke. 133 pp.; and CRS Report 97–1044 F, Navy/DARPA Maritime Fire Support Demonstrator (Arsenal Ship) Program: Issues Arising From Its Termination, by Ronald O'Rourke. 6 pp. Both reports are out of print and are available directly from the author.

[52] See, for example, Stephen M. Carmel, "A Commercial Approach to Sea Basing—Afloat Forward Staging Bases," U.S. Naval Institute Proceedings, January 2004: 78–79; Christopher J. Castelli, "Budget Anticipates Developing MPF(F) Aviation Variant From LMSR," Inside the Navy, January 19, 2004; Christopher J. Castelli, "Brewer Proposes Commercial Ship To Test Seabasing Technologies," Inside the Navy, January 27, 2003; Christopher J. Castelli, "In POM–

The CVE in the CSBA report, like the 57,000-ton carrier in the OFT report, can be viewed as a medium-sized carrier. With a full load displacement of perhaps about 40,000 tons, the CVE would be somewhat smaller than the 57,000-ton carrier and consequently might embark a smaller air wing. The CVE, however, would be based on the LHA(R) amphibious ship design rather than a merchantlike hull, and consequently could incorporate more survivability features than the 57,000-ton carrier. The proposal in the CSBA report for a new undersea superiority system with a procurement cost 50 percent to 67 percent that of the *Virginia*-class SSN design is similar to the Tango Bravo SSN discussed earlier in this testimony.

The proposals in the CSBA report for a reduced-cost new-design surface combatant called the SCX, and for a low-cost gunfire support ship, are broadly similar to the options for a reduced-cost new-design surface combatant discussed earlier in this testimony.

Fleet Capability

CNA Report. The CNA report uses essentially the same kinds of ships and formations as planned by the Navy, and recommends generally the same numbers of ships as a function of forceplanning variables such as use of crew rotation. As a consequence, the CNA-recommended force range would be roughly similar in overall capability to the Navy's planned architecture.

OFT Report. The OFT architecture differs so significantly from the Navy's planned architecture that assessing its capability relative to the Navy's planned architecture is not easy. As a general matter, the OFT report stresses overall fleet survivability more than individual-ship survivability, and argues that fleet effectiveness can be enhanced by presenting the enemy with a complex task of having to detect, track, and target large numbers of enemy ships. The OFT report argues that in addition to warfighting capability, a fleet can be judged in terms of its capability for adapting to changes in strategic demands and funding levels.[53]

Readers who agree with most or all of these propositions might conclude that the OFT-recommended architecture would be more capable than the Navy's planned architecture. Readers who disagree with most or all of these propositions might conclude that the OFT-recommended architecture would be less capable than the Navy's planned architecture. Readers who agree with some of these propositions but not others (or who agree with these propositions up to a certain point, but less fervently than OFT), might conclude that the OFT-recommended architecture might be roughly equal in total capability to the Navy's planned architecture.

In addressing the question of fleet capability, the OFT report states:

> Alternative fleet formations consisting of small fast and relatively inexpensive craft combining knowledge and attaining flexibility through networking appear superior to the programmed fleet for non-traditional warfare in a variety of settings. This is due to increasing the complexity the enemy faces and increasing U.S. fleet options that in turn reduce enemy options. The speed and complexity of the alternative fleets can provide them with the capability to complicate and possibly defeat the attempts of non-traditional adversaries to elude surveillance. The enemy could have difficulty determining what to expect and how to defeat them all. The superior

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04, Navy Cancels JCC(X), Plans To Substitute MPF(F) Variant," Inside the Navy, September 2, 2002; Christopher J. Castelli, "Navy May Develop New Support Ships, Pursue Sealift Experimentation," Inside the Navy, May 27, 2002.

[53] The OFT report argues that its recommended fleet architecture would:

- "provide a quantum leap ahead in capabilities against a spectrum of enemies ranging from large, highly developed competitors to small but determined asymmetric adversaries" (page 6) and be adaptable, in a dynamic and less-predictable security environment, to changing strategic or operational challenges;
- be capable of both participating in joint expeditionary operations and maintaining "the strategic advantage the Navy has developed in the global commons," avoiding a need to choose between optimizing the fleet for "performance against asymmetric challenges at the expense of its ability to confront a potential adversary capable of traditional high intensity conflict," such as China; (pages 1 and 2)
- pose significant challenges to adversaries seeking to counter U.S. naval forces due to the "large numbers of combat entities that the enemy must deal with; a great variety of platforms with which the enemy must contend; speed; different combinations of forces; distribution of forces across large areas; and [adversary] uncertainty as to the mission and capabilities of a given platform;" (page i)
- permit more constant experimentation with new operational concepts, and thereby achieve higher rates of learning about how to evolve the fleet over time; and
- recognize potential future constraints on Navy budgets and make the Navy more smoothly scalable to various potential future resource levels by shifting from a fleet composed of limited numbers of relatively expensive ships to one composed of larger numbers of less expensive ships.

> speed and more numerous participants than in the programmed fleet provide a stronger intelligence base and more numerous platforms from which to conduct strikes and interceptions. This appears to be true even if the smaller craft are individually somewhat less capable and less able to sustain a hit than the larger ships in the programmed fleet.
>
> If these circumstances are not achieved, and the enemy can continue to elude and deceive, the [Navy's] programmed fleet often is as good as the [OFT] alternatives, sometimes even better. It is not necessarily better in cases in which individual ship survivability dominates, a perhaps counterintuitive result until we realize that fleet survivability not individual ship survivability is what dominates.
>
> An area in which programmed fleets might have an advantage would be when the long loiter time or deep reach of CTOL [conventional takeoff and landing] aircraft on programmed big-deck CVNs [nuclear-powered aircraft carriers] is needed. That said, there need be no great sacrifice. With airborne tanking, the VSTOL [very short takeoff and landing] aircraft in the alternatives could meet the deep strike and long loiter demands. Also, as mentioned earlier, a combination of advances in EMALS [electromagnetic aircraft launch system] and modifications to the JSF will make it possible to launch the JSF with only a marginal range-payload capability penalty. Moreover, trends in technology are providing unmanned aircraft greater capability, including greater loiter time and sensor capability.[54]

CSBA Report. The CSBA report argues that its architecture would provide a total capability equal to that of the Navy's planned architecture, but at a lower total cost, because the CSBA architecture would:

- employ new ship designs, such as the new undersea superiority system and the SCX, that, because of their newer technologies, would cost less than, but be equal in capability to current designs such as the *Virginia*-class SSN and DD(X) destroyer; and
- make more use of the LPD–17 hull design, whose basic design costs have already been paid, and which can be produced efficiently in large numbers and adapted economically to meet various mission requirements.

It is plausible that using newer technologies would permit new, reduced-cost, ship designs to be more capable than such designs would have been in the past. Whether the increases in capability would always be enough to permit these ships to be equal in capability to more expensive current designs is less clear. The Navy may be able to achieve this with a new SSN design, because several new submarine technologies have emerged since the *Virginia*-class design was developed in the 1990s, but achieving this with a new large surface combatant design could be more challenging, because the DD(X) design was developed within the last few years and few new surface combatant technologies may have emerged since that time. If one or more of the reduced-cost designs turn out to be less capable than current designs, then the CSBA architecture would not generate as much total capability as the report projects.

The CSBA report also argues that its architecture would produce a force with a mix of capabilities that would better fit future strategic demands. To achieve this, the report recommends, among other things, reducing currently planned near-term procurement of new destroyers and MPF(F) ships, increasing currently planned procurement of new amphibious ships, and changing the currently planned investment mix for aircraft carriers.

Readers who agree with CSBA's description of future strategic demands, and who agree that CSBA's recommended investment changes respond to those demands, might conclude that the CSBA-recommended architecture would be better optimized than the Navy's planned architecture to meet future needs. Readers who disagree with one or both of these propositions might conclude that the Navy's planned architecture might be better optimized, or that neither architecture offers clear advantages in this regard.

Transition Risks

CNA Report. Since the CNA report uses essentially the same kinds of ships and naval formations as those in use today or planned by the Navy, and recommends similar numbers of ships, the transition risks of shifting from the Navy's currently planned force to the CNA-recommended force would appear to be small.

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[54] OFT report, pp. 75–76. Italics as in the original.

OFT Report. The OFT report does not include a detailed plan for transitioning from today's fleet architecture to its proposed architecture,[55] but such a plan could be developed as a follow-on analysis. The plan could involve replacing existing ship designs and associated formations as they retire with OFT's recommended new ship designs and associated formations.

Compared to the CNA-recommended force, the OFT-recommended force would pose significantly greater transition risks because of the number of new ship designs involved, the differences between several of these ship designs and today's designs, and the new kinds of naval formations that would be used, which could require development of new doctrine, concepts of operations, and tactics.

CSBA Report. A stated goal of the CSBA report is to provide a detailed, practical transition road map for shifting from today's fleet structure to the report's recommended fleet structure. The many specific recommendations made in the report could be viewed as forming such a road map. Given that the CSBA-recommended force represents, in terms of ship designs and formations, more of a departure from Navy plans than the CNA-recomended force, but less of a depature from current Navy plans than the OFT-recommended force, the transition risks of the CSBA-recommended force might be viewed as somewhere in between those of the CNA- and OFT-recommended forces.

Implications For Industrial Base

CNA Report. Since the CNA report uses essentially the same kinds of ships and naval formations as those in use today or planned by the Navy, and recommends similar numbers of ships, the industrial-base implications of the CNA-recommended force would appear to be similar to those of the Navy's current plans.

OFT Report. The OFT report seeks to reduce unit shipbuilding costs, and thereby permit an increase in total ship numbers, by shifting the fleet away from complex, highly integrated ship designs that are inherently expensive to build and toward less-complex merchant-like hulls and small sea frames that are inherently less expensive to build. Similarly, the OFT report seeks to increase shipbuilding options for the Navy by shifting the fleet away from complex, highly integrated ship designs that can be built only by a limited number of U.S. shipyards and toward less-complex merchant-like hulls and small sea frames that can be built by a broader array of shipyards. The OFT report also aims to make it easier and less expensive to modernize ships over their long lives, and thereby take better advantage of rapid developments in technology, by shifting from highly integrated ship designs to merchant-like hulls and sea frames.

As a consequence of these objectives, the OFT report poses a significant potential business challenge to the six shipyards that have built the Navy's major warships in recent years. The report's discussion on implementing its proposed architecture states in part:

> The shipbuilding industrial base would also need to start to retool to build different types of ships more rapidly. Smaller shipyards, which presently do little or no work for the Navy could compete to build the smaller ships, thereby broadening the capabilities base of ship design and construction available to the Navy. The change to smaller, lower unit cost ships would also open up overseas markets. With more shipyards able to build the ships and potential for a broader overall market, the U.S. shipbuilding industry would have the chance to expand its competence, innovation and relevance. Taken together this would sharpen the industry's ability to compete and provide alternatives to a ship procurement system that is beset by laws and regulations that frustrate, even pervert, market forces.[56]

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[55] On the topic of transitioning to the proposed fleet architecture, the report states:

Implementation of the alternative fleet architecture should start now and should target option generation, short construction time, and technology insertion. The alternative further provides an opportunity to reinvigorate the shipbuilding industrial base. The many smaller ships, manned and unmanned, in the alternative fleet architecture could be built in more shipyards and would be relevant to overseas markets. The potential longevity of the existing fleet will sustain existing shipyards as they move into building smaller ships more rapidly in this broader market and more competitive environment. The shipyards would develop a competence, broad relevance, and operate in an environment driven by market imperatives instead of a framework of laws that frustrates market forces.

As the new ships enter service and the fleet has the opportunity to experiment with new operational concepts (expanded network-centric warfare in particular) existing ships can be retired sooner to capture operations savings. At this point, the sooner the existing fleet is retired, the sooner the benefits of the alternative fleet architecture design will accrue. (Page 3)

Additional general discussion of implementation is found on pp. 76–77 of the report.

[56] OFT report, p. 76.

The report's concluding section lists five "dangers" that "risk the Navy's 'losing the way.'" One of these, the report states, is "Shielding the shipbuilding industrial base from global competition," which the report states "guarantees high cost, limited innovation, and long cycle times for building ships."[57]

CSBA Report. The CSBA report similarly raises significant potential issues for the six shipyards that have built the Navy's major warships in recent years. The report states that "Rationalizing the defense industrial base is . . . a critical part of the Department of the Navy's (DON) maritime competition strategy, and should be the subject of immediate consideration and deliberation by Congress, DOD, and the DON."[58] The report states:

> Numerous studies have indicated that the six Tier I yards [i.e., the six yards that have built the Navy's major warships in recent years] have "exorbitant excess capacities," which contribute to the rising costs of [Navy] warships, primarily because of high industrial overhead costs. These capacities are the result of "cabotage laws and fluctuating national security acquisition policies that force shipbuilders of combatants to retain capacities to address required surges in coming years." This last point is especially important: the DON contributes greatly to the problem of "exorbitant capacities" by its consistent tendency to portray overly optimistic ramp ups in ship production in budget "out years."[59]

The report recommends the following as part of its overall transition strategy:

- Minimize production costs for more expensive warships (defined in the report as ships costing more than $1.4 billion each) by consolidating production of each kind of such ship in a single shipyard, pursuing learning curve efficiencies, and requesting use of multiyear procurement (MYP) whenever possible.
- Minimize production costs for warships and auxiliaries costing less than $1.4 billion each by emphasizing competition, shifting production to smaller "Tier II" yards, using large production runs, and enforcing ruthless cost control.[60]

The report states that "the strategy developed in this report suggests that [Navy] planners might wish to:"

- maintain production of aircraft carriers at NGNN,
- consolidate production of large surface combatants and amphibious ships at NG/Ingalls, and
- consolidate submarine building GD/EB, or with a new, single submarine production company.[61]

The report states that the second of these possibilities is guided by the building sequence of LPD–17s and SCXs recommended in the report, NG/Ingalls' ability to build a wider variety of ships than GD/BIW, NG/Ingalls' surge capacity, and the availability of space for expanding NG/Ingalls if needed.[62]

The report states that the third of these possibilities is guided by the low probability that procurement of *Virginia*-class submarines will increase to two per year, the cost savings associated with consolidating submarine production at one yard, GD/EB's past experience in building SSBNs and SSNs, GD/EB's surge capacity, and the fact that building submarines at GD/EB would maintain two shipyards (GD/EB

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[57] OFT report, p. 80.
[58] CSBA report, slide 314.
[59] CSBA report, slide 315.
[60] CSBA report, slide 316. Other steps recommended as part of the report's overall transition strategy (see 60 slides 124 and 125) include the following:
- Plan to a fiscally prudent steady-state shipbuilding budget of $10 billion per year.
- Maximize current capabilities and minimize nonrecurring engineering costs for new platforms by maintaining and pursuing hulls in service, in production or near production that can meet near- to mid-term global war on terrorism requirements and that are capable of operating in defended-access scenarios against nuclear-armed regional adversaries.
- Identify and retain or build large numbers of common hulls that have a large amount of internal reconfigurable volume, or that can carry a variety of modular payloads, or that can be easily modified or adapted over time to new missions.
- Pursue increased integration of Navy and Marine warfighting capabilities and emphasize common systems to increase operational effectiveness and reduce operation and support (O&S) costs.
- Focus research and development efforts on meeting future disruptive maritime challenges, particularly anti-access/area-denial networks composed of long-range systems and possibly weapons of mass destruction.

[61] CSBA report, slides 317–318.
[62] CSBA report, slide 318.

and NGNN) capable of designing and building nuclear-powered combatants of some kind.[63]

The report acknowledges that yard consolidation would reduce the possibilities for using competition in shipbuilding in the near term and increase risks associated with an attack on the shipbuilding infrastructure, but notes that DOD consolidated construction of nuclear-powered carriers in a single yard years ago, and argues that competition might be possible in the longer run if future aircraft-carrying ships, the SCX, and the new undersea superiority system could be built in Tier II yards.[64]

The report states:

> Given their current small yearly build numbers, consolidating construction of aircraft carriers, surface combatants, and submarines in one yard [for each type] makes sense. However, the same logic does not hold true for auxiliaries and smaller combatants. These ships can normally be built at a variety of Tier I and Tier II yards; competition can thus be maintained in a reasonable and cost-effective way. For example, competing auxiliaries and sea lift and maneuver sea base ships between NASSCO, Avondale, and Tier II yards may help to keep the costs of these ships down.
>
> Building multiple classes of a single ship [type] is another prudent way to enforce costs, since the DON can divert production of any ship class that exceeds its cost target to another company/class that does not. Simultaneously building both the [Lockheed] and [General Dynamics] versions of [the] LCS, and the Northrop Grumman National Security Cutter, Medium [i.e., the medium-sized Deepwater cutter] gives the DON enduring capability to shift production to whatever ship stays within its cost target. . . .
>
> Of course, Congress and the DON may elect to retain industrial capacity, and to pay the additional "insurance premium" associated with having excess shipbuilding capacity. For example: Congress and the DON might wish to retain two submarine yards until the [undersea superiority system] design is clear, and wait to rationalize the submarine building base after potential [undersea superiority system] yearly production rates are clear. . . .
>
> In a similar vein, Congress and the DON might wish to retain two surface combatant yards until the design of the SCX is clear, and wait to rationalize the surface combatant building base after potential SCX yearly production rates are clear. In this regard, Congress could consider authorizing a modest additional number of [Aegis destroyers] to keep both BIW and Ingalls "hot" until the SCX is designed. . . .
>
> The key point is that the U.S. shipbuilding infrastructure must be rationally sized for expected future austere shipbuilding budgets, and whatever fiscally prudent [Navy] transition plan is finally developed by DON planners.[65]

SUMMARY

In summary, the following can be said about the three reports:

- The CNA report presents a fairly traditional approach to naval force planning in which capability requirements for warfighting and for maintaining day-to-day naval forward deployments are calculated and then integrated. The CNA-recommended force parallels fairly closely current Navy thinking on the size and composition of the fleet. This is perhaps not surprising, given that much of CNA's analytical work is done at the Navy's request.
- The OFT report fundamentally challenges current Navy thinking on the size and composition of the fleet, and presents an essentially clean-sheet proposal for a future Navy that would be radically different from the currently planned fleet. This is perhaps not surprising, given both OFT's institutional role within DOD as a leading promoter of military transformation and retired admiral Cebrowski's views on network-centric warfare and distributed force architectures.
- The CSBA report challenges current Navy thinking on the size and composition of the fleet more dramatically than the CNA report, and less dramatically than the OFT report. Compared to the CNA and OFT reports, the CSBA report contains a more detailed implementation plan and a more detailed discussion of possibilities for restructuring the shipbuilding industrial base.

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[63] CSBA report, slide 318. See also slide 298.
[64] CSBA report, slides 318–319.
[65] CSBA report, slide 319.

Mr. Chairman, distinguished members of the subcommittee, this concludes my testimony. Thank you again for the opportunity to appear before you to discuss these issues. I will be pleased to respond to any questions you might have.

Senator TALENT. Thank you.

Mr. Toner and Dr. Dur, let me get this off just asking you a question. I am going to reference the GAO report about how improved management practices could help minimize cost growth. They examined eight shipbuilding programs. They attributed the overruns to labor hour increases, material price increases—those two together were 78 percent of the overruns. Do you think the report accurately calculated labor hour increases? If so, what factors do you think drive those increases?

Mr. TONER. Well, if I could talk primarily about the submarine.

Senator TALENT. Sure.

Mr. TONER. Mr. O'Rourke brought it forth and I did also—the issue in the submarine community really goes to how much labor can you really take out of the program. I know Admiral Clark is fond of showing the 637 class submarine and the 774 submarine and the tremendous growth. We are expensive and there is a cost associated with the capability that we provide. But you have to go dig in a little bit below that because the changes are very subtle.

If you look at the percentage of man-hours relative to labor compared to a 637-class ship, which was built in 1967, which I happened to work on, unfortunately I guess, and the 774, which I also went to sea on, 36 percent—it is about 16 percent less man-hours as a percentage of the whole for labor on the 774 submarine.

The material portion of the——

Senator TALENT. Percentage of the whole cost?

Mr. TONER. Total cost, the mix. It went from close to a 43–57 into a two-third, one third. So the cost is now wrapped around a thing called material. What really happened then, in 1991, 1992, with the rescission of the *Seawolf* the submarine industrial base collapsed. People had been making plans for a 30-ship fleet. It disappeared. At that time we had something like on the order of 11,000 suppliers. It shrunk to 4,500 suppliers, 83 percent who are sole source. That phenomenon, that ability to have that impact on the material cost, drove the cost significantly.

So how much labor can you take out of a process? We could probably be on the order of $1 million to $200 million over a period of time through learning as you build more and more ships. The real question is what happens to the industrial base, the material suppliers for your equipment and components to go on the ship. It has changed dramatically, and it changed as a result of that decision in 1992.

I feel very strongly that we are at the same decision point in DD(X). If we have the same type of environment, and it collapses, the industrial base is going to respond to it and the number of vendors that we have is going to collapse and our price is going to go up.

Dr. DUR. May I take a crack at the same question?

Senator TALENT. Yes.

Dr. DUR. I will tell you that, let us take a ship with which I am very familiar, the LPD–17. In the escalation of the labor portion of that ship, we began construction of the ship with the design not

stable and therefore we were not able to outfit the unit assemblies to the degree that we wanted to. We had to begin building the ships before it was outfitted and every shipbuilder knows that when you outfit at the erection site or when the ship is in the water you pay a huge premium, and the time to outfit is when you are building the blocks or the unit assemblies. We were not able to do that to the degree we wanted to on that ship and we incurred significant growth as a result.

Second, sir, the estimates based on——

Senator TALENT. Can I jump in just so I understand what you are saying? Do you mind?

Dr. DUR. Sure.

Senator TALENT. Do not forget your second point.

Is it okay with you?

Senator COLLINS. Yes.

Senator TALENT. To emphasize something that I notice when I visit shipyards. In other kinds of manufacturing—I understand where the Navy is coming from maybe in not fixing design, because with technology changing the way it is they want to be able to take advantage during the design and production process of changes in technology. If you fix it too much at the beginning, then you are frozen into technology or the idea is you may be frozen into technology that may be outmoded by the time you finish building the ship.

But what I understand you to be saying is that we are dealing with a product that is so big and so unwieldy that if you try and design it in the shipyard after you have set it up, any change generates such extra expenses. Is that basically what you are saying?

Dr. DUR. Absolutely. What I was saying is that——

Senator TALENT. If I had let you make your second point, you might have covered that.

Dr. DUR. We were anxious to begin building the ship. The ship was delayed. The ship was delayed for a variety of reasons which I will not bore you with here, all of them before I came on the scene. But the ship was delayed, so there was a lot of anxiety to begin production of the ship. The design was not yet complete.

So we began building what we had designed, and subsequently then we had to insert a lot of pipe details, a lot of other bulkhead structures and the like, that were not available at the time we began construction. That was an exigency of the delay in that whole program, but it did result in significant labor growth.

But the biggest and most important reason, Mr. Chairman, is that the estimates for how much vessel labor it would take to build the ship were developed from a contract design generated by the Navy. That contract design did not have enough detail to allow us to realistically estimate the cost.

Let me give you an example. When you estimate the cost of a ship, in the past we have used traditional benchmarks: dollars per ton of steel, dollars per linear foot of weld, dollars per feet of cable pulled and connected. When you are dealing with a ship that is the first ship in the surface Navy to have fiber optics, for example, to move data around and therefore has to share cableways with electrical cabling, never having done that, we ran into huge cost excursions.

Titanium pipe in lieu of the traditional copper-nickel piping for seawater systems. Blast-proof bulkheads, never before put on an amphibious ship. Stealth considerations and fairness of steel, never before an issue in amphibious warfare ship construction.

One man ballasts and deballasts this 24,000 ton ship from a single station. The amount of hydraulic, pneumatic piping, control circuits to make that possible are enormous—all of them missed in the original cost estimation of the ship and the vessel labor required to build it.

So no wonder when you rack up the vessel labor on the lead ship of a class with this kind of sophistication, never built before in this class of ship, and you compare it to cost estimates for vessel labor based on old thumb rules and benchmarks, you end up with huge differences in cost.

We know what they cost now. We are coming down a very good learning curve. We have five of these ships under construction and I guarantee you that the committee will be impressed with what learning yields when you have a steady, stable production rate of the same class of ship.

Senator TALENT. Do you want to comment on that, Mr. O'Rourke? Then I will defer to Senator Collins.

Mr. O'ROURKE. Just one thing, to get back to your question earlier about the apparent tension between the idea of wanting to leave spaces in the ship undesigned so as to adapt to new rapidly changing technologies and the need to outfit sections of the ship as much as you can before you try and hook the ships——

Senator TALENT. You put it a lot better than I did, thank you.

Mr. O'ROURKE. I think the tension has to do with what parts of the ship you are looking at. There are some structures in the ship that you would like to know how to build so that you can outfit the sections while they are still in the factory, before you hook them up and put them in the water. That I think is what Dr. Dur was referring to, that he did not have those sections designed to a level of detail that he would have preferred to permit that kind of outfitting and then they had to take these sections and put them in the water before they put in these basic structures.

What you were referring to is the idea of having spaces in the ship that are flexible interfaces, if you will, that will adapt to rapidly changing technologies that may be installed on the ship over its life cycle. I do think the Navy wants to incorporate that more and more into its ship designs, and I think the ship designers support that because it will allow these ships to be finally equipped with the most up to date technology at the point when they enter service and also allow them to be updated more easily over their life cycle.

But the requirement for that is to have a standard defined space in the ship with known power outlets and so on, these standard interfaces, so that the designers of the rapidly changing technology, the electronics and so on that go aboard the ship, can know that in advance and work with it. There really is no contradiction between the two. Dr. Dur was referring to the fact that the more basic structures on the ship had not been designed in detail.

Senator TALENT. Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

I want to begin by thanking all three of our witnesses for truly excellent statements that are very helpful to the subcommittee.

I truly believe that the winner take all, or what I call the one shipyard acquisition strategy, would be disastrous for our national security. If our Nation needed to surge its shipbuilding capability, it could not do so overnight.

Mr. Toner, your testimony makes that point very well when you are talking about Bath Iron Works (BIW) and the skilled crafts people who are producing very sophisticated, complex ships. You point out that, "each skilled shipyard mechanic requires approximately 5 years to gain full proficiency at a training cost of $50,000. Similarly, each engineer and designer requires an investment of 3 years and 60 to $90,000."

I notice that Dr. Dur is also nodding in agreement about the investment that is made to get that skilled workforce. That is why the strategy which the Navy is proposing, which would jeopardize that skilled industrial base, causes me such concern.

I would like to ask all three of you to comment on a question related to this, and that is, if we needed to surge our shipbuilding capacity would it not be—and we were down to only one yard or, frankly, if we needed to get our shipbuilding just to the level that we know from Admiral Clark's testimony it should be at today—would it not be extremely expensive and take years to actually reconstitute a shipyard that had been closed? Would it even be possible to reestablish a shipyard that had been closed?

Mr. Toner?

Mr. TONER. I can take a crack at that. I think if you look at our friends in England and their *Astute* submarine program, they are trying to reconstitute their submarine capacity in England, essentially going down to one shipyard. They are struggling mightily with that. The design capability just does not exist and in fact they came to, through the Navy, came to us, Electric Boat, to ask to support them in conducting the design.

When you go look at the ship—and I have walked the ship there a couple times—you can see that they want to do the right things, but they have not gotten all the experience. You make decisions that are really ingrained in your learning over 40 years of building ships, that if it is gone you do not really replace it. You have to learn all those things over again, and all those lessons learned were learned at extreme expense, both personal and financial for the companies making those investments. No company today based on the return that you would get would start down that path once again.

So I firmly believe once a major naval shipyard closes, it is done. It is not going to come back. More importantly, of course, are the people. The yard is just bricks and mortar and what-not. But the people that go every day to that yard, they are going to go do something else because they are good people; they are capable people; and they are going to be gone. There just is not enough time and hours in the day to get it back.

Senator COLLINS. In fact, at both BIW and Ingalls you see generations of families working at the shipyards, who have developed enormous skills that would be lost.

Dr. DUR. I was just going to add, in our case we have partnerships with Gulf Coast Community College where many of our basic shipbuilding skills—electrical workers, pipefitters, pipe welders, machinists—all matriculate in a very, very sophisticated environment in the Gulf Coast Community College system, as well as the apprentice programs we have in high schools for people to learn how to work composites and polymers.

These are new things that are initiatives that have been taken by the State and the community. Take the shipyard away and there is no substitute to regenerate the interest in crafts and skills.

We may be one of the last vestiges of America's manufacturing base, and you lose this and regenerating it would be, in my estimation, very near impossible.

Senator COLLINS. Mr. O'Rourke?

Mr. O'ROURKE. I agree that it would take a lot of time and money to reconstitute a second yard capable of building complex surface combatants. To begin with, if you close a yard and sell off the waterfront property, you cannot reconstitute it at that site at all. That is a one-time decision. If it gets turned into condos you are not going back from that decision.

Assuming you have the waterfront property, it then depends on what is already there at the point in time when you decide to reconstitute. If you are starting with a bare patch of sand, it can take several years and possibly hundreds of millions of dollars in capital investment, and that is just for the production plant. That does not get to the issue of forming the workforce and also the management team to supervise that yard.

If it is in fact a yard that is already up and running to some degree, then the time and cost could be less, but still substantial.

You asked earlier about the ability to surge. I think your ability to surge to higher rates of production if needed is made easier if you have two yards because you have two different labor markets that you would have available to you on a regional basis to tap into to make new hires, and also because you would have two management teams available to oversee the increased production. Either of the two current yards could surge to higher rates of production, but together they can do it with less stress individually on each of them.

If I could return to a question you had earlier when the CNO was here, you asked what he thought the value was of having competition in the design of the DD(X). I believe that it was valuable in spurring innovation in the DD(X) design. As a general principle, as an analyst, my view is that competition in design does have value in helping to generate new ideas sooner, or more of those ideas. I am not sure that the DD(X) today would have had as many good ideas incorporated into it had it not been designed in a competitive environment.

Senator COLLINS. Thank you. You actually anticipated my next question to you, so thank you for answering it.

Mr. Chairman, I know the hour is very late. I just want to make one final comment, and it follows up on a question that you raised with our witnesses about the cost growth, the spiraling cost growth, that the CNO cited in his testimony. I think when we look at the cost growth we have to understand the major causes of that

spiraling cost, that escalating cost that the CNO finds so disturbing, are low procurement rates, increased capabilities of the ships that we are building, instability and a lack of predictability in the budgeting that makes it more difficult for the shipbuilders to plan, and also a push to get as much advanced cutting edge technology built into these ships as quickly as possible.

So it really is a disservice if we ignore those very important factors when we analyze the cost growth. I wanted to put that on the record because I do not want the impression to be left that this cost growth is due somehow to mismanagement of costs by the shipbuilders or unreasonable labor rates or some other factor. In fact, if we had more stability, more predictable buying of our ships, that cost growth would not be as enormous, and it is because we keep wanting ships, as well we should, with more capabilities, with the best, newest technology. Those two are factors that drive up the costs.

But it is a tradeoff. It costs more to have that new technology. So I appreciate your bringing up that issue, witnesses, as well. Thank you.

Senator TALENT. Well, I just say I thank the Senator. Her time at this hearing shows her commitment to shipbuilding and naval capabilities, and she and I obviously talk a lot about this on a personal level.

I wanted them to answer the question. The CNO had just said—there is clearly disagreement here because he said that the cost growth is not explainable just by greater combat capability, propulsion power, computing technology, et cetera. I certainly agree that with the instability in funding and the general—it is unstable and it is also too low. Let us just say that it is not that it is just unstable. If it was unstable at a level that was adequate—I mean, if it was unstable in the sense that it was going from 16 to 13, you guys probably would not be complaining as much.

It is impossible for us to determine really what exactly is causing it. It is impossible for us to do a reasonable and fair oversight of what you are doing when we have costs, expenditures, pingponging around all over the place and at a level that we all have a sense is too low, because you have these enormous pressures on you because of unstable funding and funding that is too low, and the phenomena you are referring to we all agree are reasonable concerns.

So again, unless we get to a stable and adequate funding level we are not able to determine how much we should be pressuring you guys to do more than you are doing in terms of progress in this area.

Please, Dr. Dur.

Dr. DUR. If I could just comment on the point you are making, Mr. Chairman. I would agree with you fundamentally. When you compare the cost of ship production at a stable production rate with gaps between starts of fabrication that protect learning ship to ship, you end up with one set of costs. When you buy ships episodically, you gap years. You reduce production rate. You lose learning. You use green labor. The cost per ship goes up dramatically.

But I will tell you, I have not seen the analysis behind the numbers cited by the CNO in his testimony for the growth, cost growth

in the ship types. But I did look at one in detail, because we were building destroyers in the 1960s and we are building destroyers today. Our estimates show that for the shipbuilding portion of it the cost growth is more on the order of 9 percent rather than the 23 percent cited.

Most of the growth is in the government-furnished equipment, which is really not the responsibility of the shipbuilder. That is provided to us by the government at their cost.

Senator TALENT. Well, and we are all in agreement, you three and CNO are in agreement, that major issues are stability in funding—I am reading from your list, Mr. Toner—stability in funding, the need for flexible funding strategies, the problem of low-rate production, and then the overall low funding levels. So we are all in agreement that those are the problems, and if we eliminated those problems then we would be in a position to determine whether we were not—whether we needed more from you in terms of efficiency than you were able to give us.

Then we are in a position to say—and I know something about tactical aircraft production for the military. Much easier in overseeing that, to be able to say to the contractor: Look, you are not on budget; you are behind time; and the fault is yours, because you do not have these issues. Even if you do not buy as many as you think you are going to buy, you are still buying several hundred of these aircraft.

Senator Lieberman, are you ready or do you need me to filibuster on your behalf a little longer?

Senator LIEBERMAN. I am glad you did not go to the nuclear option.

Senator TALENT. Constitutional option, you mean.

Senator LIEBERMAN. Right. [Laughter.]

Thanks very much, Mr. Chairman. I regret that I am late. I had a previous conflict. I was at the closed session with Admiral Clark and then I had to go to a meeting. But knowing that would be the case, I actually did read the——

Senator TALENT. Would you yield for 2 seconds so I do not forget something?

Senator LIEBERMAN. Yes.

Senator TALENT. Evidently it is necessary housekeeping. I may forget it. Senator Kennedy was also at the closed session, and may be still trying to get here, but in the event he is not able to make it he asks that his written statement be made part of the record, and of course, without objection, we will do that.

Thank you.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT BY SENATOR EDWARD M. KENNEDY

Thank you, Mr. Chairman, for calling this hearing today. I want to join you in welcoming our witnesses here today. I particularly want to express my personal gratitude and that of the members of the committee to Admiral Clark for the wonderful performance of the men and women of the Armed Forces during the past year.

First, Mr. Chairman, I want to congratulate you on your second session serving as chairman of the Seapower Subcommittee. I specifically want to compliment you on your leadership of the subcommittee and say that I look forward to continuing to work with you in the same bipartisan fashion that has been a significant aspect of your chairmanship.

The subcommittee meets this afternoon to discuss Navy shipbuilding and the status of the shipbuilding industrial base.

Just about every year, we are presented with long-term shipbuilding plans that show how much better things will be if we can only hold on until the last years of the Future Years Defense Program. This year, we see major reductions in the plan, including the prospects for building more than one attack submarine or more than one DD(X) per year. In particular, the Navy has indicated a desire to conduct a winner-take-all competition for the DD(X) program. This raises substantial concerns about what effect this would have on the shipbuilding industrial base, not only for building DD(X) vessels, but also for building CG(X) cruisers or other major surface combatants in the future.

I believe that the world we face will continue to be one of uncertainty and unrest. Decisions we make this year will have a direct effect on the forces and capabilities that future combatant commanders will use to protect our interests. We all know that our men and women in the Armed Forces will have responded admirably in any crisis, just as they have been doing to support the operations in Afghanistan and Iraq. It is our obligation to provide them with the tools they need to ensure that they are not exposed to extraordinary risk that could have been prevented. Over the long-term, we cannot count on continual heroic performance from our sailors and marines to make up for inadequate or inappropriate investment.

Again, thank you Mr. Chairman for convening this hearing today.

Senator LIEBERMAN. Thank you, Mr. Chairman.

But I actually did read the testimony that you submitted, and I think probably the point made about the importance of the stability of funding has been gone over in some detail. My own sense of where we are now, having followed our shipbuilding programs for some number of years here, is of course there are never enough resources, but we are in a really resource-stressed time.

I suppose for some people it would be hard to accept that because obviously we are spending a lot of money every year on the Pentagon budget. On the other hand, we are dealing both with the current threat of the war on Islamic terrorism or the war of Islamic terrorism against us, and we have a responsibility to provide for the common defense on into the future, when we may face other competitors who may be much more peer competitors fighting modern but more conventional, if I can put it that way, certainly nonterrorist warfare.

We do not want to make anybody into an enemy. We want to make everybody into our friend if we can. But there are countries whose investments in military and particularly in shipbuilding are worth noting, and China is the most significant of those. I worry about whether we are investing enough to maintain our important presence as a balance of power in the Asian Pacific region.

But to get to the specifics of it, I would say, Mr. O'Rourke—and now I am going to go and be a little more parochial in terms of Electric Boat in Connecticut—that as I read your testimony prepared there was some good news, relatively speaking, which is that you said that if we keep the submarine procurement at one per year, which is one less than we hope for and think we need, but that employment levels will remain fairly steady at both Electric Boat and at Newport News, but that may not be so, probably will not be so, for designers and design capability.

I apologize if you have talked about this, but this does concern me greatly because I gather you have talked about how hard it would be to reopen a shipyard once closed. I wonder how hard it would be to reconstitute this extraordinarily specialized design capability once lost. That is the question I wanted to ask any of you to respond to.

Mr. TONER. Well, Senator, I will give a crack at it. Again, we had talked about it a little bit earlier. If I repeat myself I apologize. Basically, the design capability for a nuclear submarine is really a unique capability and once lost it is extremely difficult to reconstitute. That has been demonstrated with our friends in England and the *Astute* program. They basically struggled mightily with that program, such that we had to go over with the Navy's guidance to assist them in completing the design of their next submarine.

In our process, we are in the position for the first time in 40 years not to have a submarine design on the board.

Senator LIEBERMAN. Exactly. That is the number that jumped from your testimony.

Mr. TONER. That is a major concern of mine. It is a major concern of the Nation.

Additionally, when you look at the CNO's testimony, in figure 7 he talks about an SSBN starting, getting to sea somewhere around 2020, which seems to make sense. If you remember, Ohio delivered in 1981 and 40 years crudely, approximately, is around 2020, and that ship needs to be replaced.

If that is true, since basically it is 12 years from the start of design to delivery, given the complex nature of a nuclear submarine, that would say we would have to start the design in 2008. If you look at the existing FYDP today, there is no money for a design in 2008, although there is $600 million available for undersea superiority. If undersea superiority is not defined as a nuclear submarine, I really do not know what is.

So I think that has to be looked at and those moneys need to be moved in a fashion that would allow us to preserve the design capability and be prepared to design that ship when the time comes.

Senator LIEBERMAN. I agree with that, of course. But I do want to express a word of caution, that in some of my own conversations with folks within the Navy I am not so sure that they see that $600 million, which is in the budget over the FYDP for undersea superiority, as being exclusively for submarines.

Mr. TONER. I know they do not, sir.

Senator LIEBERMAN. You agree with that?

Mr. TONER. I have heard the same thing. I find it hard to believe, but I have heard the same thing.

Senator LIEBERMAN. I think the notion is that there may be some other systems to complement submarines that could be designed or developed or researched with that money. That is a judgment that this subcommittee and full committee is going to have to make, and Congress will.

Dr. Dur, do you have anything you would like to add to this question of design capability?

Dr. DUR. Design capability is a critical element in the industrial base that I represent, conventionally powered surface combatants and expeditionary warfare ships. Indeed, the amount of designer and engineer talent that I retain in the shipyard is very much a function of the pace of design. When people speak of year delays in this program or that, that translates into hundreds of jobs in the designer and the engineer category.

While I have been relatively successful in getting the people that I need to design the ships that I have under contract, I worry al-

ways that the day may come when I do not have the people available to me locally to do what it is I have to do by way of design. It is a critical problem.

Senator LIEBERMAN. Thank you.

Mr. O'Rourke, how seriously do you see the problem if this capacity to design atrophies? How long would it take to reconstitute the capability at the level it now exists?

Mr. O'ROURKE. I agree that there are grounds for being quite concerned about how this situation may develop if a new submarine design project is not put into place. I think the experience in the U.K. with the *Astute* class that has been referred to is potentially very instructive. If we allow that design base to atrophy, it could take a lot of time and cost to reconstitute. That is time and cost that would be built into whatever the next submarine design project is.

I started my analysis originally from a force structure point of view, and we have been getting submarines at such a low rate for so many years that we will now need to get two submarines per year starting in fiscal year 2012 or fiscal year 2013 and sustain that rate for about a dozen years just to avoid dropping below 40. That is the position we have now gotten into.

Senator LIEBERMAN. With apologies, I want to ask you to repeat that because I do not know that people understand that.

Mr. O'ROURKE. We have been procuring submarines over the last 15 years or so at an average rate of less than one boat per year. As a consequence of that, we will now need to build submarines at a rate of two per year starting in fiscal year 2012 or fiscal year 2013 and sustaining that rate for about a dozen years, just to avoid dropping below 40.

Senator LIEBERMAN. Right, and the low number in the various projections is 41, right, for attack subs?

Mr. O'ROURKE. That is right.

Senator LIEBERMAN. We are now at 58?

Mr. O'ROURKE. I think we are at 53, 54, at the moment.

If you wanted to go to something significantly higher than 41 or 45 boats, then you are talking about building more than 2 boats per year. But you need two boats per year just to avoid dropping below 40.

Now, the reduction of the *Virginia* class to one boat per year in the FYDP frankly is a signal that *Virginia*-class procurement may never be more than one per year. If you think there is any truth to that, then you need to begin looking immediately at a way of getting to two attack submarines per year starting a few years from now. If the *Virginia* class is too expensive for that, then the alternative is to look for a less expensive submarine.

Now, we happen to be in the potentially happy situation of having some new technologies at hand that were not available when the *Virginia* class was designed, that could allow industry and the Navy to design a submarine that is substantially less expensive than the *Virginia* class and yet still be equivalent to the *Virginia* class in capability. If you were to begin the design of that submarine today and pursue that project in a concerted manner, then the lead boat might be ready for procurement in fiscal year 2011.

That could allow you to increase the procurement rate of that less expensive boat to two per year starting in fiscal year 2012 or fiscal year 2013. So I started my analysis from a force structure perspective and it led me to examine that option. But it also has the happy coincidence of providing a submarine design project for the design and engineering base, which otherwise is looking at nothing to do and at the prospect of atrophying over the next several years. So it could in a sense take care of two problems at the same time. It could position the acquisition situation to go to two per year more easily within available resources and it also provides a way of sustaining the submarine design and engineering base. Once they complete that design they could roll over into the design of the SSBN that was mentioned a few minutes ago, and when they complete that SSBN they can go back and do a downstream generation attack submarine. Through that sequence of three designs, you have a strategy for keeping the submarine design and engineering base going for 15 or so more years into the future.

Senator LIEBERMAN. Very interesting proposal.

When you speak of new technologies, are you thinking of the air-independent propulsion?

Mr. O'ROURKE. In the case of the less expensive nuclear powered submarine, I am talking about the so-called Tango Bravo technologies.

Senator LIEBERMAN. You are thinking about a less expensive nuclear submarine, I got you.

Mr. O'ROURKE. That is right. In fact, I think it is, from a capability point of view, it is important to realize the differences between an air independent propulsion (AIP) submarine and a nuclear-powered submarine, and also to note that with the Tango Bravo technologies we are in a situation, I have been given to understand, where we can have a submarine as capable as the *Virginia* class, but at some lower cost.

It is not often in the ship design business that you can be in a situation of having your cake and eating it too, but we may just be in that situation right now with submarine design.

Senator LIEBERMAN. Mr. Chairman, you have been very generous and gracious with the time.

My final question is just to ask Dr. Dur and Mr. Toner if they would respond to Mr. O'Rourke's point. It was going to be my last question, which is rising naturally out of the facts that we see and the pressure on resources and the concern about the cost of the *Virginia*-class attack submarines. The question is, is this an alternative way to go? I think one of the concerns the Navy has is that we are unable to match potential peer competitors one for one because they are turning out obviously less able submarines, but much less expensive as well. Is there a point at which we should be trying to maximize, just as was said, have the continuing one a year of the *Virginia* class or something like it at that level of superiority, and then something less expensive that is also nuclear?

Mr. TONER. Well, I think what Mr. O'Rourke has said has a lot of merit to it. The technologies that he is talking about on the Tango Bravo are really technologies that focus on the ability to build the ship in an easier fashion. For example, the external weapons mod would do away with the torpedo room, a very com-

plex portion of the ship to build, very labor intensive, very costly. An integrated power supply such that we are propelling the ship with external motors, does away with the so-called tyranny of the shaft and all it brings.

So it is possible to go build a smaller ship and perhaps it would be a little bit cheaper. But again, you have to also consider there is something good about volume. This concept and the designs that would do away with these various portions of the ship allow us to have significant more volume to put a lot of different things in.

As far as the cost goes, cost is not really dollars per ton on a submarine. It is how much goes inside the sausage, if you will. That is where the rubber meets the road.

Senator LIEBERMAN. Obviously we are not going to get into specific cost estimates, but under the kind of scenario we are talking about under the Tango Bravo program as an example, would there be significant savings in comparison to the *Virginia*-class subs?

Mr. TONER. It would depend, I think, from my opinion—and for the record, we can probably provide you a white paper with those type numbers on it.

Senator LIEBERMAN. Please do that. I would appreciate that.

Mr. TONER. But what I would be concerned about is as you start to build this, the learning curve is going to come down on the *Virginia*-class submarine. Right now both the two ships, the 774 and 775, are lead ships and they are being produced. As we start to come down that curve—and we are going to come down it because there are two very capable shipyards building it—the price of *Virginia* is going to come down.

The question will be with regard to the startup of this new ship, where is that going to cross and is it really going to be cheaper. Intuitively, you say yes, I think we can get there. But is it a big number or a little number? I would not necessarily put all my eggs in that basket to say, I am going to build a cheaper submarine.

Virginia started out on that same path, and if you look at the fragility of the vendor base that supplies the material for these ships, we have significant issues with it. So it could be, yes, it could be. Is it significant or not? I am not really sure. But we will put together a white paper to show you that for the record if I could.

Senator LIEBERMAN. Please do. I appreciate that. Thank you.

[The information referred to follows:]

JOINT UNDERSEA SUPERIORITY

Background: OSD Program Budget Decision 753 directed the Navy to reduce the *Virginia*-class submarine procurement rate to one ship per year through 2011. It also requested an additional $600 million across the FYDP, $50 million of which is in the fiscal year 2006 President's budget to design a future undersea superiority system. Although the undersea superiority system capabilities that will be developed are still under evaluation, nuclear powered submarines will play a key role. Concurrently, the Defense Advanced Research Program Agency—in conjunction with the Navy—is funding the Tango Bravo (Technology Barriers) program to develop technologies that can break some traditional design paradigms that drive the cost and construction schedule of present submarines.

Discussion: The *Virginia*-class submarines can provide the necessary stealth, endurance, agility, and firepower to effectively contribute to joint undersea superiority. Since repeated studies show that combatant commanders require attack submarines in numbers that can only be supported by building at least two ships per year, reducing Virginia acquisition cost through spiral development to allow higher procurement rates should be a central focus of the joint undersea superiority study. *Vir-*

ginia acquisition cost reduction is achievable through a multifaceted approach that as a minimum should include:

- Leveraging the class learning curve to reduce the cost of Block II ships to under $2 billion in current year dollars. Contracts would be structured to ensure the government that learning curve savings could be realized.
- Funding efforts to redesign aspects of *Virginia* that specifically enable a greater use of commercial off-the-shelf equipment for both contractor and government furnished equipment. This would counter the ongoing trend of sole source providers and thus increasingly expensive component costs.
- Funding research designed to optimize construction methodologies including the development of larger modules with increased outfitting and test to further reduce in-hull construction man-hours.

The above actions are expected to reduce acquisition cost in the *Virginia* class and future submarine designs and can be demonstrated in the first ship (SSN784) of the Block III Virginia program in 2009. A *Virginia* class redesign in selected areas can also incorporate Tango Bravo technologies as they mature, providing valuable information and key risk reduction for the design of future submarines (e.g., replacement SSBN). This approach brings Tango Bravo technology to sea earlier and provides submarines with the interface capabilities they will need to support the off-board elements of future joint undersea superiority systems. Moreover, these efforts contribute to the maintenance of the submarine design industrial base that is critical to the Nation's defense.

Recommendation: Dedicate the $50 million in the fiscal year 2006 budget and the $600 million additional undersea superiority funding across the FYDP to *Virginia* redesign efforts that would reduce acquisition cost and accelerate the deployment of new technologies needed to maintain joint undersea superiority.

Dr. Dur, do you want to add anything quickly?

Dr. DUR. Senator, I am not an expert on submarine construction, so I think I will defer to my colleague who is.

Senator LIEBERMAN. A very wise move.

Dr. DUR. Thank you, sir.

Senator LIEBERMAN. Thank you all very much for excellent testimony, very provocative, gives us a lot to think about and hopefully to do something about as we deliberate on the DOD authorization bill for next year.

Mr. Chairman, thank you very much for convening this hearing.

Senator TALENT. Thank you, Senator. Those comments I think will serve as closing comments for the hearing. I want to thank all three of you for coming and for your expertise.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

INTELLIGENCE REQUIREMENTS

1. Senator KENNEDY. Admiral Clark, your ability to meet wartime requirements with a smaller force depends on having intimate knowledge of the intentions of potential enemies to make the Fleet Response Plan successful. Otherwise, the enemy could fake mobilizations several times to wear out our ability to respond. Then, after we have taken the fleet home for necessary maintenance and crew rest, they could attack for real. Since we have just seen how poorly the Intelligence Community performed in assessing actual capabilities in Iraq, what gives you any confidence that we will be able to rely on the Intelligence Community for an unambiguous assessment of the enemies' intentions?

Admiral CLARK. [Deleted.]

SUBMARINE FORCE STRUCTURE

2. Senator KENNEDY. Admiral Clark, the last thorough analysis we have seen regarding attack submarine force structure requirements was the one conducted by the Joint Chiefs of Staff in 1999. It stated that, in the near-term, the Navy needed to have 55 attack submarines, and that in the middle of the next decade, we would need to have some 68 to 72 attack submarines in the fleet to meet our most pressing

requirements. The latest 30-year shipbuilding plan submitted to Congress in March showed that the long-term force structure goal for attack submarines, including nuclear-powered cruise missile attack submarines, would be only 41 to 45 boats. During the hearing, you implied that other systems or capabilities would provide adequate capability to substitute for some or all of the peacetime intelligence, surveillance, and reconnaissance (ISR) needs being met by our submarine force. Please provide more information on specifically what systems or capabilities the Navy has identified, either within the Navy or within other parts on the Government, that will fulfill these peacetime ISR requirements of the combatant commanders.

Admiral CLARK. [Deleted.]

INDUSTRIAL BASE STUDY

3. Senator KENNEDY. Admiral Clark, we had asked Navy representatives at previous hearings about the effect of buying smaller numbers of surface combatants on the surface combatant industrial base. Now the Navy is proposing to conduct a winner-take-all competition for the first five ships of the DD(X) program. Previous Navy studies have said that the two shipyards (Bath and Ingalls) needed the equivalent of three DDG–51s per year plus additional work to remain viable. Has the Navy conducted new analyses that says that the Navy's DD(X) acquisition strategy will be enough to keep the surface combatant industrial base viable?

Admiral CLARK. The DD(X) program budget request for fiscal year 2006 and beyond has been reduced from a class of 24–32 ships to a class of 8–12 ships. This results in a shipbuilding profile that has moved from construction of up to three ships per years to construction of one ship per year from fiscal year 2007 through fiscal year 2011. Both Northrop Grumman and General Dynamics have the capacity to independently design and construct the programmed class of DD(X) ships.

While I am not assigned responsibility for acquisition programs, I believe an open competition for the DD(X) program would optimize our acquisition execution. This is the best business case for maintaining a financially healthy shipyard to construct DD(X) ships and provides the most cost efficient method of procuring these destroyers for the Navy and the taxpayers.

Due to congressional concerns about this competitive winner-take-all acquisition strategy, other courses of action have been explored. These potential strategies are being discussed with OSD and other key stakeholders, but they do not represent the most cost efficient means to acquire DD(X).

4. Senator KENNEDY. Admiral Clark, has the Navy come to a new assessment about what surface combatant industrial base is necessary?

Admiral CLARK. Our assessment is that Navy, Congress, and the shipbuilding industry must work together to formulate a national shipbuilding plan that addresses the industrial base issues. We currently have a system of apportionment, rather than competition, and excess capacity, both of which contribute to escalating costs. To ensure we continue to act in the taxpayer's best interest, the significant increases in shipbuilding costs must be reversed and ships must be efficiently delivered to the Navy and the Nation. Shipbuilding costs have significantly exceeded inflation and the current acquisition policy constrains our ability to effectively manage shipbuilding accounts. Navy, Congress, and industry must economically deliver—through industrial improvements and acquisition policy reform—the ships that the fleet requires to fight and win our country's wars in the future.

DD(X) DESTROYER

5. Senator KENNEDY. Admiral Clark, the DD(X) destroyer is being built largely to support shore fire support requirements. At various times, we have heard that the Navy intended to buy as many as 31 ships in this class. The latest 30-year shipbuilding plan submitted to Congress in March showed that the DD(X) class would ultimately consist of only 8 to 12 ships. Have the Navy and Marine Corps done any analysis which shows that either an 8- or a 12-ship class of DD(X) destroyers would be sufficient to cover fire support requirements of the combatant commanders to support Army and Marine Corps operations ashore?

Admiral CLARK. Extensive analysis has been conducted on the class size of the DD(X) destroyer. The submitted construction profile reflects specific requirements finalized during the DD(X) detail design as the ship approaches Milestone B and Critical Design Review. Building on a body of analysis conducted since the 1990s, three separate options for DD(X) were considered to meet USMC fire support requirements. The smallest of these included a single 155MM Advanced Gun System and

required a class size of approximately 24 ships, while the larger 2 designs included 2 gun mounts and substantially larger gun magazines resulting in a ship class of approximately 12 ships.

Recent Navy force structure analysis determined that a DD(X) class size of 8–12 ships is adequate. This is sufficient to provide one DD(X) per Expeditionary Strike Group in support of smaller scale distributed operations. Analysis of projected Major Combat Operations using OSD approved scenarios indicates that 8–12 DD(X) are also adequate to surge sufficient ships to the theater to meet Naval Surface Fires Support requirements in support of one or two Marine Expeditionary Brigade-size amphibious assaults.

AMBIGUITY OF REQUIREMENTS

6. Senator KENNEDY. Mr. Toner and Dr. Dur, Mr. O'Rourke's prepared statement discusses the ambiguity of the Navy's shipbuilding plans. He indicates that long-term requirements stated in a range of 260 to 325 ships do not go far enough in resolving the ambiguity faced by the shipbuilders. Do you agree with Mr. O'Rourke's assessment, and if this is not sufficient, how narrowly would the Department have to state requirements to allow you sufficient insight for long-term planning?

Mr. TONER. I certainly agree with Mr. O'Rourke's assessment that the March 2005 report does not present a 30-year shipbuilding plan, that instead it presents a 30-year projection of potential Navy force levels from which potential annual shipbuilding rates can be only partially inferred. That said, I believe a 30-year shipbuilding plan with a 25 percent variability range would be reasonably narrow enough for planning purposes, but only if that range was held at the ship-type level, and only if that plan would be reliable. The Navy's March 2005 report included force level ranges with variability of nearly 40 for cruisers and destroyers and more than 40 percent for Maritime Prepositioning Ships. These "plans" are not very useful to me even though the report's total force level variability works out to 25. They are certainly not very useful to me if the force level projections are not supported by corresponding procurement plans that prove to be stable.

I do understand the Navy cannot predict its requirements in 30 years with certainty. What's much more important to me is stability in that planning. The March 2005 report includes an attack submarine force level requirement with only 10 percent variability. But as I pointed out in my prepared statement, the *Virginia*-class procurement plan has changed 12 times in the last 10 years, and that is but one example of instability. In the case of DD(X), the Navy has made five procurement plan changes since the fiscal year 1998 budget, slipped the lead ship authorization 4 years (to date), and revised the total force level projection from 32 ships to what is now a range of 8–12. General Dynamics made a significant capital investment in its Bath facility based on the Navy's acquisition plans. Would we have made that investment based on the current procurement plan? Or would we have made that investment knowing the Navy might or might not conduct a winner-take-all competition? Against the backdrop of these major combatant programs, one can have little confidence in the Navy's plan for future Maritime Prepositioning Ships. The March 2005 report includes force level projections that vary 43 percent for these ship types. That variability factor alone is unsettling enough. The predictability of any underlying procurement plan then, by definition if not by history, provides insufficient insight for long-term planning.

The first step must be to define a clear, predictable shipbuilding plan. As Mr. O'Rourke observed, this has not yet been accomplished.

Dr. DUR. I generally agree with the contention that a range of some 65 ships does not provide industry sufficient insight for long term planning for capital investments, work force and facilities sizing or craft training. Ideally, the Navy, the Department of Defense, and Congress would agree on an "objective" Navy force level which would be reviewed at no less than a 5-year interval. The objective force would specify ship class, number and general mission requirements. It is important that the Navy's shipbuilding plan should be derived from this agreed objective force structure. Congress should then commit to supporting a "capital investment plan" consistent with that commitment. This would treat ships as the substantial capital investment that they are and permit companies that comprise all levels of the shipbuilding industrial base to make informed decisions about their own investments ultimately lowering the procurement cost of the ships the Nation needs.

ALTERNATE SUBMARINE PROPULSION APPROACHES

7. Senator KENNEDY. Mr. O'Rourke, your prepared testimony mentions that possibility that the Navy could perhaps buy a mix of nuclear attack submarines and ones employing air-independent propulsion (AIP). Since a number of European concerns have invested heavily in developing this technology, it would appear that, if we chose to follow this approach, we might be able to acquire such technology without spending a lot more on research and development (R&D). In your opinion, would we need to invest heavily in R&D for AIP if we chose to pursue this strategy?

Mr. O'ROURKE. If a program were begun to develop and procure an AIP submarine for the U.S. Navy, and if one or more other countries that have developed AIP technology agreed to license the technology to, or otherwise share it with, the U.S. program, then the cost to develop AIP technology for the U.S. submarine could be reduced, perhaps substantially. If the safety or performance requirements for the U.S. AIP system were higher than those for the foreign AIP systems, then some amount of research and development funding might be needed to adapt the foreign AIP technology to meet the higher U.S. requirements.

A similar logic would apply to the total development and design costs for a U.S. AIP submarine. If a country with an AlP submarine design agreed to license this design to, or otherwise share it with, the U.S. program, then the total cost to develop and design the U.S. submarine could be reduced, perhaps substantially. If the safety or performance requirements for the U.S. submarine were higher than those for the foreign submarine, then some amount of development and design funding might be needed to adapt the foreign submarine design to meet the higher U.S. requirements. If a foreign submarine design is not available to the U.S. program, or if a foreign design were available but could not be adapted to meet U.S. requirements, then a substantial amount of funding would be needed to develop a new design that met U.S. requirements. The less new design work that is required, the less potential the program might have for providing near-term support to the U.S. submarine design and engineering base.

[Whereupon, at 6:00 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

TUESDAY, APRIL 19, 2005

U.S. SENATE,
SUBCOMMITTEE ON SEAPOWER,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

UNITED STATES MARINE CORPS GROUND AND ROTARY WING PROGRAMS AND SEABASING

The subcommittee met, pursuant to notice, at 3:05 p.m. in room SR–232A, Russell Senate Office Building, Senator James M. Talent (chairman of the subcommittee) presiding.

Committee members present: Senators Talent, Kennedy, Lieberman, and Clinton.

Majority staff members present: Ambrose R. Hock, professional staff member; Gregory T. Kiley, professional staff member; Thomas L. MacKenzie, professional staff member; and Stanley R. O'Connor, Jr., professional staff member.

Minority staff members present: Daniel J. Cox, Jr., professional staff member; Creighton Greene, professional staff member; and Peter K. Levine, minority counsel.

Staff assistants present: Alison E. Brill and Benjamin L. Rubin.

Committee members' assistants present: Lindsey R. Neas, assistant to Senator Talent; Mieke Y. Eoyang, assistant to Senator Kennedy; Frederick M. Downey, assistant to Senator Lieberman; and Andrew Shapiro, assistant to Senator Clinton.

OPENING STATEMENT OF SENATOR JAMES M. TALENT, CHAIRMAN

Senator TALENT. I will tell you what we will do. We will get going and when Senator Kennedy arrives maybe at the beginning of his questioning he can make an opening statement if he wants to do that.

We are meeting today to receive testimony on Marine Corps ground and rotary wing programs, on seabasing, in review of the DOD authorization request for fiscal year 2006. Before I get going on my statement, I want to recognize a couple of distinguished visitors. One of our staff assistants, Ben Rubin's parents are in the room, Steve and Nancy from Boston. In Senator Kennedy's absence—I am sure he will want to say hello also—thank you for coming and for lending us your son for a while.

We are pleased to have with us today: the Assistant Secretary of the Navy for Research, Development, and Acquisition, John Young, who has appeared before this subcommittee and the full committee on many occasions. The Deputy Commandant of the Marine Corps for Programs and Resources, Lieutenant General Magnus. Thank you for coming, General. The Commanding General of the Marine Corps Combat Development Command, Lieutenant General James Mattis. General, thank you for being here. The Deputy Chief of Naval Operations for Warfare Requirements and Programs, Vice Admiral Joseph Sestak. Joe, thank you for coming.

I want to welcome you, gentlemen, and thank you for taking time out of your busy schedules to be with us here today. I especially want you, however, to pass on how proud we are of the soldiers, sailors, marines, and airmen who are on point in the global war on terror. The sacrifices that they and their families are making daily are not going unnoticed. They are deeply appreciated by this Congress and by all the American people. This Nation is served by the finest men and women who have ever served in any military at any time. I know you all believe that.

The Corps' high operations tempo has tested the limits of the men and women of the Marine Corps and the equipment they depend upon to accomplish their mission. Today's hearing will give this subcommittee the opportunity to hear about the Corps' current and future programs to provide our marines with the best equipment available.

There are several areas we want to hear about today. The committee has closely followed the efforts of the Department of Defense (DOD) in providing force protection capabilities to our soldiers and marines in Iraq and Afghanistan for countering the threat posed by improvised explosive devices (IEDs). The committee is supportive of the efforts of the Joint IED Task Force and believes that the task force has made significant contributions to force protection solutions for our marines. However, we want to ensure that we have explored all opportunities to provide force protection and otherwise to stop IEDs and we would like to hear the Marine Corps' views on counter-IED measures, including the procurement of jammers and armored—and also armoring wheeled vehicles.

The Marine Corps is developing the Expeditionary Fighting Vehicle, a replacement for the Assault Amphibian Vehicle, to carry marines over water and land. The committee has been very supportive of this program and we were concerned to hear that the program was slipped a year in the current budget request. We understand the program not only slipped because of affordability concerns, but also because of technical issues. We want to hear about the reasons for the delay and the impact on the future Marine force.

Operations in the global war on terror have stressed the Corps' helicopter fleet. This places added importance on the programs to reset and modernize Marine helicopters. The Navy and the Marine Corps have several ongoing helicopter initiatives, but the two we would like to address today are the programs to acquire new helicopters for presidential support and for heavy lift replacement.

The Navy recently completed a source selection of the VXX helicopter and we would like to hear about the source selection process. Questions raised at a recent Airland Subcommittee hearing on the

replacement for the CH–53 program need to be addressed as well. We would also like to hear, to the extent possible, how the MV–22 Osprey is proceeding in its operational testing.

In addition to other Marine Corps programs, the subcommittee is also interested in the development of the seabasing concept. In the interim plan submitted to Congress in lieu of the annual 30-year shipbuilding plan, the Secretary of the Navy had a range of between 14 and 20 ships in the Maritime Prepositioning Force of the future, with each option also including two high-speed ships and three high-speed connectors. We have never in the past counted our Maritime Prepositioning ships in the number of ships we count in the size of the Navy.

The objective of the sea base is to assemble, deliver, and sustain a sizable force from the sea. The reason for needing the sea base is that access to a port may not be readily available. I am aware that the concept for operations is gaining definition and I look forward to hearing about it from our witnesses today.

This, however, brings up a point I feel compelled to make. If these numbers of ships are part of either a 260-ship fleet or a 325-ship fleet, then the 260-ship Navy is, as traditionally understood, only 241 ships, including 63 littoral combat ships, or the 325-ship Navy would be only 300 ships, counting 82 littoral combat ships. That means that in the traditional sense the range of size for the fleet in 30 years would be between 178 and 218 of what we would traditionally call major combatants.

While the concept of seabasing has some appeal, I am concerned about the resources required to acquire this capability and in the world of competing resources what impacts it might have on the rest of the fleet.

We will get into these and any other questions that the members of the subcommittee may wish to talk about. Again, gentlemen, I thank you for appearing before the subcommittee today. We look forward to your testimony.

We will hold Senator Kennedy's opening statement in abeyance, unless this is him. It is not. Hello, Senator Lieberman. We were just about to start the witnesses' testimony. Do you want to make any kind of a statement?

Senator LIEBERMAN. No, go right ahead.

Senator TALENT. We will start with Secretary Young, who is the Assistant Secretary of the Navy for Research, Development, and Acquisition. John, please proceed.

STATEMENT OF HON. JOHN J. YOUNG, JR., ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

Mr. YOUNG. Mr. Chairman, Senator Lieberman, it is a great privilege to appear before the subcommittee today to discuss the status of the fiscal year 2006 Marine Corps programs as well as our seabasing efforts. Mr. Chairman, thank you for introducing my colleagues here today. I want to agree with your comments and add that in multiple theaters throughout the world today, your Navy-Marine Corps team is prosecuting the global war on terror in a wide range of operations.

Your naval team has executed these operations superbly, from pursuit of hostile forces in Iraq and Afghanistan to providing humanitarian relief after the tsunami. In each of these operations, marines and sailors provided a unique demonstration to the world of the immense and timely capabilities of the Navy and Marine Corps team.

We have taken the committee's calls for urgency and discipline in acquisition to heart and worked to improve our business practices. I would like to highlight a few of the past year's actions.

Through the work of the Marine Corps and the leadership of Secretary England, when the First Marine Expeditionary Force returned to Iraq in March 2004, every vehicle had some level of armor protection and every helicopter had advanced survivability equipment. To build on this momentum, Secretary England directed and established a formalized process action team, called Operation Respond, to rapidly meet requirements generated from deployed marines. Through Operation Respond, within the limits of funding rules, the Department delivered enhanced body armor, IED jammers, ballistic goggles, unmanned aerial vehicles, and other capabilities requested by marines.

Shifting to other programs, we implemented a Joint Strike Fighter (JSF) Independent Review Team and recommended specific JSF design, ground rule assumptions, and requirements changes which restored short takeoff vertical landing (STOVL) viability. All three variants are now projected to meet their key performance parameters.

Another joint program, the V–22 Osprey, has flown in excess of 4,900 hours since resuming flight tests in May 2002. Operational Evaluation began on March 28, 2005, and should lead to a full-rate production decision in early 2006.

The H–1 upgrades development program is over 90 percent complete, with operation and evaluation (OPEVAL) for this program beginning late this summer.

The Marine Corps has taken delivery of 17 KC–130J aircraft to date, which includes four deliveries during this fiscal year. Four KC–130Js were procured in fiscal year 2005 and 12 aircraft are budgeted for procurement in fiscal year 2006. We have also continued to ensure the tactical capability of our existing KC–130 F, R, and T series aircraft by installing night vision kits and upgraded aircraft survivability equipment.

The Expeditionary Fighting Vehicle (EFV) is a self-deploying, high water speed, armored amphibious vehicle capable of transporting marines from ships located beyond the horizon to inland objectives. The EFV will replace the AAV that was fielded in 1972 and will be over 35 years old when EFV is fielded. The Milestone C LRIP is now scheduled for September 2006.

Finally, the Lightweight 155, a joint Marine Corps and Army program, replaces the current M–198. The Departments of the Navy and Army awarded an $834 million multi-year contract in March 2005, the Lightweight 155 is a very successful program.

We have also made significant progress in our shipbuilding programs that support our Expeditionary Forces. Specifically, lessons from Iraq and Afghanistan suggested we should maximize the air capability of Amphibious Assault Ship (LHA(R)) while leveraging

the design changes already made for multi-purpose amphibious assault system (LHD–8). The Navy's acquisition team worked with Navy and Marine Corps leadership to restructure LHA(R) from plug-plus to an aviation variant using the proven LHD hull and saving over $1.1 billion. The resulting design provides a transformational capability that leverages our investment in the Joint Strike Fighter and the MV–22.

The fiscal year 2006 budget request includes $66 million for Maritime Prepositioning Force Future (MPF/F) development and design. This family of ships is essential to the naval seabasing strategy and these funds are also very important to the long-term health of segments of our U.S. shipbuilding industrial base. We need your support to proceed with Maritime Prepositional Force (MPF) definition and experimentation efforts and to maintain a fully funded program. We are carefully looking at whether current generation platforms can meet a majority of the MPF requirements at lower risk and cost.

The *San Antonio,* the lead ship in the Amphibious Assault Transport Dock (LPD–17) class of amphibious transport dock ships, is approximately 93 percent complete, with delivery scheduled for fall 2005.

The much discussed current planned build rate of one DD(X) per year through the Fiscal Year Defense Program/Plan (FYDP) does not provide sufficient workload to sustain two yards in an affordable manner. We are committed to procuring those ships that the Navy needs in a manner that provides the best value to the taxpayer. The competition for DD(X) under consideration by the Navy provides several benefits. First, the competition will save a billion dollars from fiscal year 2006 to 2011 and $3 billion on the first 10 ships.

Second, the Navy will be able to focus on the design of critical subsystems of DD(X) and reduce risk and concurrency, issues of concern to Congress and others on the DD(X) program.

The Navy continues to explore alternative financing approaches for Navy ship procurement. As Secretary England has stated, these funding strategies do not allow us to build more ships in the near term. But they do allow us to more efficiently execute a program and work within the rules and challenges of annual budgets. For example, last year the Navy requested Research, Development, Test, and Evaluation (RDT&E) funds for lead ship construction, an approach that mirrors the development method used in every other DOD weapons program. Our fiscal year 2006 budget request includes RDT&E funding for the second Littoral Combat Ship.

Our fiscal year 2006 budget submission also includes two other shipbuilding financing approaches. We have requested authority to fund procurement of the LHA(R) replacement ships and the new generation aircraft carrier over 2 years. This permits the Department to level out the funding spikes associated with large-cost capital ships. The other financing mechanism included in our budget is the use of advanced procurement funds for lead ship production design. Since production design for new ships spans between 18 and 30 months, this jump-start will permit design efforts to begin a year ahead of full funding so the start of fabrication will be closer

to the year the lead ship is authorized and appropriated and that budget request will be more informed by the design of the ship.

Mr. Chairman, out of respect for the subcommittee, I will stop, leaving much more to say.

[The prepared statement of Mr. Young follows:]

PREPARED STATEMENT BY HON. JOHN J. YOUNG, JR.

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's (DON) Fiscal Year 2006 Acquisition and RDT&E programs. In multiple theaters in the global war on terror today, your Navy and Marine Corps Team is involved in a range of operations, from combat ashore to Extended Maritime Interdiction Operations (EMIO) at sea. EMIO serves as a key maritime component of global war on terror, and its purpose is to deter, delay, and disrupt the movement of terrorists and terrorist-related materials at sea. Your team has conducted over 2,200 boardings in this last year alone, even as it has flown more than 3,000 sorties while dropping more than 100,000 pounds of ordnance from sea-based tactical aircraft in Iraq; and providing nearly 5,000 hours of dedicated surveillance in and around Iraq to coalition forces.

At the same time, our Nation took advantage of the immediate global access provided by naval forces to bring time-critical assistance to tsunami victims in South Asia. By seabasing our relief efforts in Operation Unified Assistance, the *Abraham Lincoln* Carrier Strike Group (CSG) and the Bonhomme Richard Expeditionary Strike Group (ESG)—with marines from the 15th Marine Expeditionary Unit—delivered more than 6,000,000 pounds of relief supplies and equipment quickly, and with more political acceptance than may have been possible if a larger footprint ashore might have been required.The fiscal year 2006 budget request maximizes our Nation's return on its investment by positioning us to meet today's challenges—from peacekeeping/stability operations to global war on terror operations and small-scale contingencies—and by transforming the force for future challenges.

YOUR FUTURE NAVY AND MARINE CORPS TEAM

We developed the Sea Power 21 vision in support of our National Military Strategy. The objective of Sea Power 21 is to ensure this nation possesses credible combat capability on scene to promote regional stability, to deter aggression throughout the world, to assure access of Joint Forces and to fight and win should deterrence fail. Sea Power 21 guides the Navy's transformation from a threat— based platform centric structure to a capabilities-based, fully integrated force. The pillars of Sea Power 21—Sea Strike, Sea Shield, and Sea Base—are integrated by FORCEnet, the means by which the power of sensors, networks, weapons, warriors and platforms are harnessed in a networked combat force. This networked force will provide the strategic agility and persistence necessary to prevail in the continuing global war on terror, as well as the speed and overwhelming power to seize the initiative and swiftly defeat any regional peer competitor in Major Combat Operations (MCO).

The Navy and Marine Corps Team of the future must be capabilities-based and threat-oriented. Through agility and persistence, our Navy and Marine Corps Team needs to be poised for the "close-in knife fight" that is the global war on terror, able to act immediately to a fleeting target. The challenge is to simultaneously "set the conditions" for a MCO while continuing to fight the global war on terror, with the understanding that the capabilities required for the global war on terror cannot necessarily be assumed to be a lesser-included case of an MCO. Our force must be the right mix of capabilities that balances persistence and agility with power and speed in order to fight the global war on terror while prepared to win a MCO. To do so, it must be properly postured in terms of greater operational availability from platforms that are much more capable as a distributed, networked force. While the fabric of our fighting force will still be the power and speed needed to seize the initiative and swiftly defeat any regional threat, FORCEnet's pervasive awareness (C4ISR) will be more important than mass. Because of its access from the sea, the Navy and Marine Corps are focusing significant effort and analysis in support of joint combat power projection by leveraging the maneuver space of the oceans through Seabasing. Seabasing is a national capability that will project and sustain naval power and joint forces, assuring joint access by leveraging the operational maneuver of sovereign, distributed and fully networked forces operating globally from the sea, while accelerating expeditionary deployment and employment timelines. The Seabased Navy will be distributed, netted, immediately employable and rapidly deployable, greatly increasing its operational availability through innovative con-

cepts such as, for example, Sea Swap and the Fleet Response Plan. At the same time, innovative transformational platforms under development such as MPF(F), LHA(R) and High-Speed Connectors, will be instrumental to the Sea Base.

To this end, the technological innovations and human-systems integration advances in future warships are critical. Our future warships will sustain operations in forward areas longer, be able to respond more quickly to emerging contingencies, and generate more sorties and simultaneous attacks against greater numbers of multiple aimpoints and targets with greater effect than our current fleet. The future is about the capabilities posture of the fleet. Our analyses is unveiling the type and mix of capabilities of the future fleet and has moved us away from point solutions towards a range of 260–325 ships that meet all warfighting requirements and hedges against the uncertainty of alternate futures.

DEVELOPING TRANSFORMATIONAL JOINT SEABASING CAPABILITIES

The Naval Power 21 vision defines the capabilities that the 21st Century Navy and Marine Corps Team will deliver. Our overarching transformational operating concept is Sea Basing; a national capability, for projecting and sustaining naval power and joint forces that assures joint access by leveraging the operational maneuver of sovereign, distributed, and networked forces operating globally from the sea. Seabasing unifies our capabilities for projecting offensive power, defensive power, command and control, mobility and sustainment around the world. It will enable commanders to generate high tempo operational maneuver by making use of the sea as a means of gaining and maintaining advantage.

Sea Shield is the projection of layered defensive power. It seeks maritime superiority to assure access, and to project defense overland.

Sea Strike is the projection of precise and persistent offensive power. It leverages persistence, precision, stealth, and new force packaging concepts to increase operational tempo and reach. It includes strikes by air, missiles, and maneuver by Marine Air Ground Task Forces (MAGTF) supported by sea based air and long-range gunfires.

Sea Base is the projection of operational independence. It provides the Joint Force Commander the ability to exploit EMW, and the capability to retain command and control and logistics at mobile, secure locations at sea.

FORCEnet is the operational construct and architectural framework for naval warfare in the joint, information age. It integrates warriors, sensors, networks, command and control, platforms and weapons into a networked, distributed combat system.

Sea Trial is the Navy's recently created process for formulating and testing innovative operational concepts, most of which harness advanced technologies and are often combined with new organizational configurations, in pursuit of dramatic improvements in warfighting effectiveness. Sea Trial concept development and experimentation (CD&E) is being conducted in close coordination with, the Marine Corps combat/force development process and reflects a sustained commitment to innovation. These efforts tie warfare innovation to the core operational challenges facing the future joint force.

As a means of accelerating our investment in Naval Power 21, we employ the Naval Capability Development Process (NCDP) and Expeditionary Force Development System (EFDS). The NCDP and EFDS take a concepts-to-capabilities approach to direct investment to achieve future warfighting wholeness. The NCDP takes a sea-based, offensive approach that provides power projection and access with distributed and networked forces featuring unmanned and off-board nodes with penetrating surveillance via pervasive sensing and displaying that rapidly deliver precision effects. The EFDS assesses, analyzes and integrates MAGTF warfighting concepts, and requirements in a naval and joint context to support the overarching operational concept of Joint Seabasing. Both processes are designed to incorporate innovative products of Service and Joint CD&E and Science and Technology (S&T) efforts.

The fiscal year 2006 budget request reflects the investments that will most improve our warfighting capability by developing and investing in future sea based and expeditionary capabilities for the Navy and Marine Corps. I will briefly address transformation of our capabilites describing some of the key program enablers. I will then highlight the S&T and CD&E developments that ensure continued transformation now and well into the future.

SEA SHIELD

Littoral Combat Ship (LCS)

LCS will be built from the keel up to be a part of a netted and distributed force. The key warfighting capability of LCS will be its off-board systems: manned helicopters and unmanned aerial, surface and underwater vehicles. It is the off-board vehicles—with both sensors and weapons—that will enter the highest threat areas. Its modular design, built to open-systems architecture standards, provides flexibility and a means to rapidly reconfigure mission modules and payloads. Approximately 40 percent of LCS's payload volume will be reconfigurable. As technology matures, the Navy will not have to buy a new LCS seaframe, but will upgrade the mission modules or the unmanned systems. LCS will be different from any warship that has been built for the U.S. Navy. The program provides the best balance of risk with affordability and speed of construction. We have partnered with the Coast Guard. LCS will share a common three-dimensional radar with U.S. Coast Guard cutters, and in addition, there are other nations interested in purchasing the seaframe.

Two contracts were competitively awarded in May 2004, for detail design and construction of two different LCS Flight 0 seaframes. . Flight 0 is comprised of four ships that will develop and demonstrate several new approaches to naval warfare including suitability of large-scale modular mission technologies and new operational concepts in the littoral. The detail design and construction of the first LCS flight 0 ship began in fiscal year 2005. To date, all milestones have been met on schedule. Detail design for the second ship is ongoing with construction starting in fiscal year 2006. The two remaining seaframes for LCS Flight 0 will be requested in fiscal year 2007. The LCS spiral development acquisition strategy will support construction of multiple flights of focused mission ships and mission packages with progressive capability improvements. Procurement of the three mission packages (Mine Warfare, Surface Warfare and Anti Submarine Warfare) is also planned in fiscal year 2006. The Department is well positioned to proceed with LCS and deliver this needed capability to sailors as soon as possible.

Multi-mission Maritime Aircraft (MMA)/P–3C

The future for the Navy's maritime patrol force includes plans for sustainment, modernization, and re-capitalization of the force. Results of the P–3 Service Life Assessment Program (SLAP) have revealed the need for an aggressive approach to P–3 airframe sustainment. Key elements of the sustainment plan are strict management of requirements and flight hour use, special structural inspections to keep the aircraft safely flying, and increased use of simulators to satisfy training requirements. The fiscal year 2006 budget request reflects $74.5 million for Special Structural Inspections (SSI) and Special Structural Inspections—Kits (SSI–K), which will allow for sustainment and continued operation of approximately 166 aircraft. As the sustainment plan progresses, the inventory may be further reduced to a number approaching 130 aircraft. The fiscal year 2006 budget request also reflects a modernization budget of $51.3 million for continued procurement and installation of the USQ–78B acoustic processor and for completion of final installations of Anti-Surface Warfare Improvement Program (AIP) kits. We are working on plans for further mission system modernization to allow us to continue meeting COCOM requirements. To recapitalize these critical aircraft, the Navy is procuring a MMA. The MMA program entered System Development and Demonstration (SDD) phase in May 2004 and awarded a contract to the Boeing Corporation for a 737 commercial derivative aircraft. The fiscal year 2006 budget requests $964.1 million for continuation of MMA SDD. Our comprehensive and balanced approach has allowed for re-capitalization of these critical assets.

MH–60R and MH–60S

The fiscal year 2006 budget requests $655.5 million in procurement and $48.1 million in RDT&E for the replacement of the Light Airborne Multi-Purpose System (LAMPS) MK III SH–60B and carrier-based SH–60F helicopters with the new configuration designated as MH–60R. The procurement quantity was reduced to provide an orderly production ramp. A Full Rate Production decision is scheduled during the second quarter of fiscal year 2006. The fiscal year 2006 budget requests $608.7 million in procurement and $78.6 million in RDT&E funds for the MH–60S, which is the Navy's primary combat support helicopter designed to support Carrier and Expeditionary Strike Groups. It will replace four legacy platforms with a newly manufactured H–60 airframe. The MH–60S is currently in the full rate 5-year MYP contract with the Army. The Army and Navy intend to execute another platform MYP contract commencing in fiscal year 2007. Navy's total procurement require-

ment was increased from 237 to 271 to provide a force structure that supports the Navy-approved Helicopter concept of operations.

Ship Self-Defense System (SSDS)

The fiscal year 2006 President's budget requests $40.5 million to complete the Follow-On Test and Evaluation (FOT&E) in U.S.S. *San Antonio* (LPD 17) and begin live-fire testing in the SDTS. The SSDS is designed to expedite the detect-through-engage process for amphibious ships and aircraft carriers against anti-ship cruise missiles (ASCMs). SSDS consists of a combination of software and commercial off-the-shelf hardware intended to integrate sensor and engagement systems. Progress during fiscal year 2004 focused on the industry formal qualification tests of the SSDS MK 2 system and the delivery and test of the system in U.S.S. *Reagan,* CVN 76. SSDS MK2 is implementing open architecture to enable sharing of common command systems applications across the surface fleet.

Organic Mine Countermeasures

The fiscal year 2006 budget requests RDT&E and procurement funding for a variety of airborne mine countermeasure systems, which will be employed by the MH–60S helicopter as an organic capability within the Navy's strike groups. Specific systems are:

- The AN/AQS–20A Advanced Mine Hunting Sonar and the Airborne Mine Neutralization System (AMNS) are being developed to counter deep moored mines and visible bottom mines. The Navy is requesting $3.4 million for the AN/AQS–20A to complete system developmental testing, initiate and complete operational testing and award a contract for six AN/AQS–20A systems. For AMNS, the Navy is requesting $7.7 million to conduct contractor testing, complete system developmental testing and to reach Milestone C.
- The AN/AES–1 Airborne Laser Mine Detection System (ALMDS) and the AN/AWS–2 Rapid Airborne Mine Clearance System (RAMICS) are being developed to counter near surface and floating mines. The Navy is requesting $5.9 million in OPN for four ALMDS units in addition to the four LRIP units purchased in fiscal year 2005. For RAMICS, the Navy is requesting $16.2 million to complete contractor testing and to begin developmental testing.
- The Organic Airborne and Surface Influence Sweep (OASIS) System will ensure the Navy will maintain an assured access capability and counter influence mines that may not be found using other mine hunting systems. The Navy is requesting $13.9 million for the completion of developmental and operational testing leading to LRIP buys in fiscal year 2007.
- The Remote Mine Hunting System (RMS) is being developed as an unmanned semi-submersible vehicle to deploy from both the DDG–51 Class (hulls 91–96) and the LCS. This system will provide an over-the-horizon organic mine hunting capability to ensure our combatants stay free of mine danger areas. We are also exploring the multi-mission potential of the RMS vehicle (which is the Remote Mine-hunting Vehicle (RMV)) as one of the systems for our LCS, ASW mission module package. The fiscal year 2006 budget request for OPN for RMS is $85 million for four RMS systems and $34.2 million for RMV ASW mission package (four vehicles).
- The Assault Breaching System involves a family of systems that provides the capability to detect, avoid, and defeat mines and obstacles in the surf and beach zone in support of ship to objective maneuver. The fiscal year 2006 request includes $31 million that would support further development of a multi-spectral imaging sensor (COBRA) deployed from the Fire Scout VTUAV to detect mines and obstacles on the beach and to initiate development of counter-mine counter-obstacle munitions, as well as navigation and tactical decision aid systems.

SEA STRIKE

DD(X) Destroyer

DD(X) is the centerpiece of a surface combatant family of ships that will deliver a broad range of capabilities. It is already providing the baseline for spiral development of technology and engineering to support a range of future ship classes such as CG(X), LHA(R), and CVN–21. This advanced multi-mission destroyer will bring revolutionary improvements to precise time-critical strike and joint fires for our Expeditionary and Carrier Strike Groups of the future. It expands the battlespace by over 400 percent; has the radar cross section of a fishing boat; and is as quiet as a *Los Angeles* class submarine. DD(X) will also enable the transformation of our op-

erations ashore. Its on-demand, persistent, time-critical strike revolutionizes our joint fire support and ground maneuver concepts of operation so that our strike fighter aircraft are freed for more difficult targets at greater ranges. DD(X) will provide credible forward presence while operating independently or as an integral part of naval, joint, or combined expeditionary forces.

The fiscal year 2006 budget request includes $1.1 billion in RDT&E for continued technology development and $716 million in SCN advance procurement funds for the first and second DD(X). DD(X) will dramatically improve naval surface fire support capabilities available for joint and coalition forces. Planned technologies, such as integrated power system and total ship computing environment in an open architecture, will provide more affordable future ship classes in terms of both construction and operation. DD(X) will be the first forward-fit surface combatant with an open architecture combat system. This investment will be leveraged to other surface ship procurements, including CVN 21 and LHA(R).

The FYDP includes full funding for the first DD(X) in fiscal year 2007 and construction of one ship per year in each follow on year. DD(X) will provide the hull form and propulsion for the future generation of surface combatants that provide an array of 21st century naval capabilities.

SSGN

The fiscal year 2006 budget requests $287 million of procurement funding for the conversion of the fourth and final submarine to be converted to SSGN. When completed, these submarines will provide transformational warfighting capability carrying up to 154 Tomahawk cruise missiles and support deployed Special Operating Forces. The four SSGN conversions are being executed utilizing a public-private partnership conducting the work in naval shipyards, and are scheduled for delivery by fiscal year 2007. The Navy has experienced minor scope changes as we have refueled and converted these submarines. The Navy is working to resolve these issues, but any changes are difficult to address with the rules and constraints of short duration modifications relying on procurement funds.

F–35 Joint Strike Fighter (JSF)

Our recapitalization plan includes the JSF, a stealthy, multi-role fighter aircraft designed jointly to be an enabler for Naval Power 21. The fiscal year 2006 budget request contains $2.4 billion for continuation of System Development and Demonstration on the JSF. The JSF will enhance the DON's precision strike capability with unprecedented stealth, range, sensor fusion, improved radar performance, combat identification and electronic attack capabilities compared to legacy platforms. The carrier variant (CV) JSF complements the F/A–18E/F and EA–18G in providing long-range strike capability and much improved persistence over the battlefield. The short takeoff and vertical landing (STOVL) JSF combines the multi-role versatility of the F/A–18 and the basing flexibility of the AV–8B. The commonality designed into the JSF program will reduce acquisition and operating costs of Navy and Marine Corps tactical aircraft and allow enhanced interoperability with our Allies and sister Services.

The JSF has completed the third year of its development program, and the program continues working to translate concept designs to three producible variants. Manufacture/assembly of the first flight test aircraft conventional takeoff and landing (CTOL) is underway and roughly 40 percent complete, with assembly times much less than planned. Two thousand engine test hours have been completed through mid-January 2005. Detailed design work continues for the CTOL and STOVL variants. First flight is scheduled for 2006. The JSF program has aggressively addressed the performance issues associated with weight and airframe design. The STOVL variant weight has been reduced by 2500 lbs. through design optimization. Installed thrust improvements and aerodynamic drag reduction as well as requirements tailoring are being incorporated to further improve aerodynamic performance. All three variants are projected to meet Key Performance Parameter requirements.

The JSF program is completing a replan effort that began approximately a year ago. The software block plan and test plan are being reviewed consistent with the revised schedule and Service needs. The fiscal year 2006 budget reflects the revised System Development and Demonstration and production schedule.

V–22

The MV–22 remains the Marine Corps' number one aviation acquisition priority. The Osprey's increased range, speed, payload, and survivability will generate transformational tactical and operational capabilities. Ospreys will replace the aging Marine fleets of CH–46E and CH–53D helicopters beginning in fiscal year 2005, which will provide both strategic and tactical flexibility to meet emerging threats in the

global war on terror. Utilization far above peacetime rates, and the physical demands of continuous operations in the harsh conditions of Iraq and Afghanistan, are accelerating the deterioration and increasing operating costs of the legacy aircraft that the MV–22 will replace. These factors make a timely fielding of the MV–22 critical. The fiscal year 2006 budget request includes $1.3 billion for nine MV–22s, trainer modifications and retrofits and $206.4 million for continued development, testing, and evaluation. The V–22 Osprey resumed flight-testing in May 2002, and it has flown in excess of 4,900 hours. The Commander Operational Test and Evaluation Force (COTF) Letter of Observation was completed in February 2005 to support Section 123 Certification to Congress to allow the program to increase production above minimum sustaining rate of 11 aircraft. Operational Evaluation will begin in March 2005 leading to Full Rate Production in early fiscal year 2006.

Heavy Lift Replacement Program (HLR, CH–53X)

The fiscal year 2006 budget requests $272 million RDT&E to begin the SDD phase of the HLR program that will replace the aging fleet of CH–53E platforms. The Marine Corps' CH–53E continues to demonstrate its value as an expeditionary heavy-lift platform, with significant assault support contributions in Afghanistan, the Horn of Africa and Iraq. Vertical heavy lift will be critical to successful operations in anti-access, area-denial environments globally, enabling force application and focused logistics envisioned within the joint operating concepts.

The CH–53E requires significant design enhancements to meet future interoperability requirements, improve survivability, expand range and payload performance, improve cargo handling and turn-around capabilities, and reduce operations and support costs. An Analysis of Alternatives determined that a "new build" helicopter would be the most cost-effective solution. The Operational Requirements Document defining HLR capabilities was approved in December 2004. The HLR will fill the vertical heavy lift requirement not resident in any other platform that is necessary for force application and focused logistics envisioned in Sea Basing and joint operating concepts. With the ability to transport 27,000 pounds to distances of 110 nautical miles under most environmental conditions, commanders will have the option to insert a force equipped with armored combat vehicles or two armored High Mobility Multi Wheeled Vehicles (HMMWVs) per sortie. To sustain the force, the HLR will be able to transport three independent loads tailored to individual receiving unit requirements and provide the critical logistics air connector to facilitate sea-based operations. This reliable, cost-effective heavy lift capability will address critical challenges in maintainability, reliability, and affordability found in present-day operations supporting the global war on terror.

F/A–18 A/B/C/D

The fiscal year 2006 budget request contains $422.4 million for the continuation of the systems upgrade programs for F/A–18 platform. As the F/A–18 program transitions to the F/A–18E/F, the existing inventory of over 900 F/A–18A/B/C/Ds will continue to comprise half of the Carrier Strike Group until 2012. Included in this request is the continued procurement of recently fielded systems such as Joint Helmet Mounted Cueing System, Advanced Targeting FLIR, Multi-Function Information Distribution System, and Digital Communications System. The Marine Corps continues to upgrade 76 Lot 7–11 F/A–18A and C to Lot 17 F/A–18C aircraft capability with digital communications and tactical data link. The Marine Corps anticipates programmed upgrades to enhance the current capabilities of the F/A–18C/D with digital communications, tactical data link and tactical reconnaissance systems. This upgrade ensures that our F/A–18s remain viable and relevant in support of Tactical Air Integration and Expeditionary Maneuver Warfare. The Marines expect the F/A–18A+ to remain in the active inventory until 2015. The marines are also employing the Litening targeting pod on the F/A–18 A+ and D aircraft in OIF. When combined with data link hardware, the Litening pod provides real time video to ground forces engaged with the enemy. The capabilities of the Litening pod with data link are highly effective for Marine Corps expeditionary F/A–18 operations. The fiscal year 2006 budget request also includes procurement of Center Barrel Replacements to extend service life of F/A–18A/C/Ds 7 years to meet fleet inventory requirements until 2022.

EA–18G

The E/A–18G continues development as the Navy's replacement for the EA–6B Airborne Electronic Attack (AEA) aircraft. The Navy is using the F/A–18E/F multi-year contract to buy four Systems Design and Development aircraft in fiscal year 2006 to install and integrate Northrop Grumman's in-production Improved Capabilities (ICAP)–III AEA system. These aircraft will support EA–18G operational testing and allow the department to deliver the next generation (AEA) capability at reduced

cost and in the shortest possible timeframe. The Marine Corps initiated studies to examine options for replacing their electronic attack aircraft. The fiscal year 2006 budget request reflects $409 million for Systems Design and Development. The Systems Design and Development continues on schedule with construction underway of the two development aircraft. First flight is scheduled for the fourth quarter of fiscal year 2006. A total quantity of 30 systems will be procured in LRIP with a planned fiscal year 2009 IOC and fiscal year 2012 FOC. The EA–18G will replace carrier-based Navy EA–6B aircraft by 2012.

AH–1Z/UH–1Y

The H–1 Upgrades Program will remanufacture 180 AH–1W and 100 UH–1N helicopters into state-of-the-art AH–1Z and UH–1Y models. The fiscal year 2006 budget requests $307.5 million APN funds to procure 10 UH–1Y/AH–1Z aircraft and $42.0 million RDT&E funds to complete the H–1 Upgrades Engineering and Manufacturing Development phase. The development program is over 90 percent complete with five aircraft being readied for OPEVAL, which will begin this summer. Work on the first LRIP lot, awarded to Bell Helicopter in December 2003, is progressing well and the second LRIP lot will be awarded by the end of March 2005. The program is seeking opportunities to reduce unit cost and minimize the negative impact the remanufacture strategy could have on ongoing military operations. Regarding the latter point, we anticipate that some number of airframes will be newly fabricated instead of remanufactured in order to reduce the amount of time aircraft would otherwise be out of service. The optimum mix of remanufactured and newly fabricated aircraft is being evaluated with the results to be reflected in future budget requests. The H–1 Upgrade Program is a key modernization effort designed to resolve existing safety deficiencies, enhance operational effectiveness of both the AH–1W and the UH–1N, and extend the service life of both aircraft. The program will provide 100 UH–1Ys and 180 AH–1Zs with 10,000 hour airframes. Additionally, the commonality gained between the AH–1Z and UH–1Y (84 percent) will significantly reduce lifecycle costs and logistical footprint, while increasing the maintainability and deployability of both aircraft.

AV–8B

The fiscal year 2006 budget requests $15.5 million RDT&E funds to support development of the Engine Life Management Plan (ELMP)/Accelerated Simulated Mission Endurance Testing, Tactical Moving Map Display, and Aircraft Handling initiatives. The fiscal year 2006 budget also requests $36.6 million procurement funding for Production Line Transition efforts, procurement of Open Systems Core Avionics Requirement, ELMP upgrades, and the Readiness Management Plan which addresses aircraft obsolescence and deficiency issues associated with sustaining the AV–8B until JSF transition.

EA–6B

The fiscal year 2006 budget request of $120.6 million reflects the total budget for wing center section modifications and procurement of three Improved Capability (ICAP) III systems. The aging EA–6B has been in ever-increasing demand as DOD's only tactical radar jamming aircraft that also engages in communications jamming and information operations. EA–6B operational tempo has continued at extremely high levels during the past year. Safety considerations, due to wing center section and outer wing panel fatigue, have reduced aircraft available to the fleet from 95 to 85. Aircraft inventory is projected to return to above 95 by the end of fiscal year 2005. Program priorities are current readiness and successful fleet introduction of the ICAP III selective reactive jamming system.

Precision Guided Munitions (PGM)

The U.S Navy weapons programs of the 21st century are evolving to address the challenges of a dynamic and unpredictable enemy. New weapon systems are planned or have been developed and delivered to the combatant commanders to provide new options to engage enemy forces in support of the global war on terror. The Navy's fiscal year 2006 budget supports PGM programs that continue to allow domination of the maritime environment, support in-land operational forces, and enhance the overall department strategy to deter and dissuade potential adversaries while supporting our allies and friends.

Joint Direct Attack Munitions (JDAM)

JDAM has been the Department's weapon of choice for OEF/OIF. In October 2004, the U.S. Navy provided an Early Operational Capability and accelerated deliveries for a 500 lb. JDAM variant (GBU–38) for Navy F/A–18 A+/C/D platforms. After approving production of this variant, we immediately deployed it in order to meet an

urgent warfighter need to employ precision munitions with limited collateral effects in the congested urban environments of Iraq. The fiscal year 2006 budget request of $82.6 million procures 3,400 DON JDAM tail kits for all variants, thus supporting all current and projected warfighter requirements. The fiscal year 2006 budget reduces procurements to 1,500 kits per year starting in fiscal year 2008; however, the Department will closely monitor all JDAM variant requirements and combat expenditures in order to make any necessary adjustments.

Joint Standoff Weapon (JSOW)

A new variant of the JSOW called JSOW–C was approved for Full Rate Production in December 2004. Similar to the new 500 lb. JDAM program, this capability is in demand by the warfighter to provide new options for precision attack against point targets vulnerable to blast fragmentation effects and hardened targets. The new JSOW–C variant employs an augmenting charge with a follow-through penetrator bomb for hard targets that can also be set to explode both payloads simultaneously. This lethal package is coupled with an Imaging Infrared Seeker and GPS/INS to provide the standoff precision attack capability in demand by the warfighter. The fiscal year 2006 budget fully funds JSOW–C production and support. It also shifts funding from production of a submunition variant of JSOW to all JSOW–Cs until there is resolution of unexploded battlefield ordnance issues that are of concern to the Department and our allies. The Navy/contractor JSOW Team is dedicated to reducing acquisition costs. Specifically, we are expecting to achieve a unit cost reduction of more than 25 percent by 2006 due to the implementation of lean initiatives, innovative processes, and engineering changes.

Tactical Tomahawk (TACTOM)

The fiscal year 2006 budget supports the Navy's commitment to replenish our precision-guided munitions inventories utilizing the Navy's first MYP contract for a weapon. TACTOM entered Full Rate Production in August 2004. We completed our second and final remanufacture program, converting all available older Tomahawk airframes to the latest Block III configuration. The Firm Fixed Price 5 year contract (fiscal years 2004–2008) for TACTOM will save the taxpayer 12 percent over annual procurements. TACTOM's advanced design and manufacturing processes have cut procurement cost to $729,000 or half the cost of a Block III missile and maintenance costs by half of the cost of its predecessor. TACTOM provides a more capable missile with a 15-year product warranty and a 15-year recertification interval. This approach mitigates price growth of follow-on procurements by providing incentive for the contractor to manage for obsolescence, which will control future price growth on follow procurements.

Expeditionary Fighting Vehicle (EFV)

The EFV remains the Marine Corps' number one ground acquisition priority and will join the MV–22 and the LCAC as an integral component of the triad required for executing Expeditionary Maneuver Warfare. The EFV is a self-deploying, high water speed, armored amphibious vehicle capable of transporting marines from ships located beyond the horizon to inland objectives. It will be the primary means of tactical mobility for the marine rifle squad during expeditionary operations. This vehicle will replace the Assault Amphibious Vehicle (AAV7A1) that was fielded in 1972 and that will be over 35 years old when the EFV is fielded. The Milestone C LRIP is now scheduled for September 2006. The approved acquisition objective is for 1,013 vehicles. Initial operational capability is scheduled for fiscal year 2010 and full operational capability is scheduled for fiscal year 2020. The fiscal year 2006 RDT&E budget requests $253.7 million to continue a robust developmental test program, to conduct a comprehensive operational assessment, to develop the LRIP vehicle design, and to develop logistics products including integrated electronic technical manuals and training devices, simulators and courseware.

Lightweight LW–155 Howitzer (M777A1)

The M777A1 is a Joint USMC/Army 155mm towed artillery system that will replace the current M198. The Marine Corps intends to procure a total of 356 howitzers with IOC in fiscal year 2005. The M777A1 is currently finishing LRIP for the Marine Corps and the fiscal year 2006 budget request includes $178.4 million to procure 77 systems. The DON and the Army awarded a $834 million multi-year contract on March 24, 2005. The M777A1 will be able to fire the Excalibur PGM, currently under development by the Army to support enhanced range requirements for joint indirect fires.

SEA BASE

LPD 17

The *San Antonio* (LPD 17) class of amphibious transport dock ships is optimized for operational flexibility and designed to meet Marine Air-Ground Task Force lift requirements and represents a critical element of the Navy and Marine Corps future in expeditionary warfare. The fiscal year 2006 budget includes $1.3 billion to fully fund the construction of the eighth ship of the class. The Navy plans to build nine LPD 17 ships with the procurement of the ninth ship planned for fiscal year 2007. The lead ship is approximately 93 percent complete with delivery scheduled for summer 2005. In addition to the lead ship, four follow on ships are currently under construction. *New Orleans* LPD 18 was christened on November 20, 2004, and *Mesa Verde* LPD 19 was christened January 15, 2005. Construction also continues on *Green Bay* LPD 20 and *New York* LPD 21. Advance procurement contracts for LPD 22 and 23 have been awarded to support long-lead time material purchases for these ships.

Lewis and Clark Class Auxiliary Dry Cargo Ammunition Ship (T-AKE)

The fiscal year 2006 budget request includes $380 million for the ninth ship. The first eight ships have are under contract. Exercise of the option for the seventh and eighth ships occurred in January 2005. Lead ship construction commenced in September 2003, with a projected delivery date of January 2006. Projected delivery dates for the other ships are as follows: second ship fiscal year 2006; third, fourth and fifth ships fiscal year 2007; sixth and seventh ships fiscal year 2008 and the eighth ship fiscal year 2009.

CVN 21 Class

The CVN 21 program is designing the aircraft carrier for the 21st century, as the replacement for the *Nimitz* class nuclear aircraft carriers. Overall, CVN 21 will increase sortie generation rate and increase survivability to better handle future threats. The new design nuclear propulsion plant and improved electric plant together provide three times the electrical generation capacity of a *Nimitz* class carrier. This capacity allows for the introduction of new systems such as Electromagnetic Aircraft Launching System, advanced arresting gear, and a new integrated warfare system that will leverage advances in open systems architecture to be affordably upgraded. Other features include an enhanced flight deck, improved weapons handling and aircraft servicing efficiency, and a flexible island arrangement allowing for future technology insertion. The fiscal year 2006 budget request includes $565 million of advance procurement for continued development of CVN 21. The program received Milestone B approval in April 2004. The construction contract is scheduled for award in fiscal year 2008, with ship delivery in fiscal year 2015.

Nimitz Class (CVN 68 Class)

The Refueling Complex Overhaul (RCOH) program refuels, repairs, and modernizes *Nimitz* class aircraft carriers to provide up to 50 years of service life. CVN 68 class was originally based on a 30-year design life with refueling at an estimated 14 years. Ongoing analysis of the reactor cores show a nominal 23 year life prior to requirement to refuel allowing the RCOH schedule to be adjusted accordingly. The RCOH Program recapitalizes these ships in lieu of procurement and is fundamental to sustaining the nuclear carrier force structure. RCOHs provide a bridge between maintaining current readiness requirements and preparing the platform for future readiness initiatives in support of Sea Power 21. They leverage technologies from other programs and platforms that support RCOH planning and production schedules for advantageous insertion during this major recapitalization effort.

In 2004, considerable progress was made on the *Eisenhower* (CVN 69) RCOH. Restructuring of the contract in December 2003, reset target cost and fee, established performance incentives, reduced minimum fee, modified shareline ratios, and extended the RCOH duration by 11 weeks. Since the contract restructuring, the shipyard's performance improved considerably, resulting in an estimated $29 million underrun at completion. This underrun has allowed the "buy back" of work that was previously descoped to avoid contract cost overruns. Significant work items reinstituted included the refurbishment of the forward crew galley and 03 level ward room, embarked flag officer spaces habitability upgrades, installation of several refurbished antennas, and combat systems electronic upgrades. Delivery of *Eisenhower* back to the fleet is scheduled for 2005.

The fiscal year 2006 budget request includes $1.5 billion in the first of two funding increments for the U.S.S. *Carl Vinson* RCOH. The fiscal year 2006 budget also includes $20 million in advance procurement funding for the U.S.S. *Theodore Roosevelt* (CVN 71) RCOH scheduled to start fiscal year 2010.

Maritime Prepositioning Force (Future) (MPF(F))

These future Maritime Prepositioning Ships will serve a broader operational function than current prepositioned ships, creating greatly expanded operational flexibility and effectiveness. We envision a force that will enhance the responsiveness of the joint team by the at-sea assembly of a Marine Expeditionary Brigade that arrives by high-speed airlift or sealift from the United States or forward operating locations or bases. The MPF(F) will support the forcible entry. These ships will offload forces, weapons and supplies selectively while remaining far over the horizon, and they will reconstitute ground maneuver forces aboard ship after completing assaults deep inland. They will sustain in-theater logistics, communications and medical capabilities for the joint force for extended periods as well. The fiscal year 2006 budget request includes $66 million of RDT&E funds to develop technologies to support future sea basing needs in MPF(F). The first MPF(F) ship is planned for fiscal year 2009 with advanced procurement award scheduled in fiscal year 2008. It is critical to the Nation's naval capabilities and our shipbuilding industrial base that we proceed with MPF(F) definition and experimentation efforts and maintain a fully funded MPF(F) program.

Landing Craft Air Cushion (LCAC) Service Life Extension Program (SLEP)

Our fleet LCACs saw dramatically increased operational tempo supporting worldwide operations during the past year, underscoring the need for the LCAC SLEP. SLEP is a vital, ongoing effort to OMFTS and STOM options for the naval forces. This will provide continued critical surface lift for the Marine Corps for the future as these upgrades offer greater flexibility and endurance options that allow naval forces to continue to remain expeditionary and versatile in support of global war on terror and into the future. The program, designed to extend the service life of LCACs to 30 years, had several notable accomplishments during the past year: LCAC 2 and LCAC 4 delivered ahead of schedule. The award of the fiscal year 2004 contract for four craft occurred in March 2004. In 2004, the SLEP effort received a DOD Value Engineering Award for the revised acquisition strategy that will deliver the required LCAC capability and service life while providing a cost savings of $104 million through the FYDP for the program. The first SLEP craft, LCAC 44, rendered assistance to tsunami victims in Indonesia as part of Operation Unified Assistance. The Navy is continuing the strategy of refurbishing vice replacing the buoyancy boxes and will competitively select the fiscal year 2005 and fiscal year 2006 SLEP work. The fiscal year 2006 budget request includes $111 million for SLEP of six craft.

LHD 8

The *Makin Island* (LHD 8) last ship of the LHD 1 Class of big deck amphibious ships represents a critical element of the Navy and Marine Corps future in expeditionary warfare. LHD 1 Class platforms provide critical lift and an expeditionary capability allowing rapid naval force response to differing crises. Offering the Joint Force Commander (JFC) a variety of options, LHD 1 Class platforms are critical power projection and C^4ISR platforms capable of embarking JFC staffs. The flexibility and versatility of the LHD 8 in Seabasing circumvents the challenges on obtaining land-basing privileges and over flight permissions in support of U.S. global war on terror missions. In accordance with congressional direction to incrementally fund LHD 8, the fiscal year 2006 budget requests $198 million for the last increment in the continued construction of LHD 8. LHD 8 will be the first big deck amphibious ship that will be powered by gas turbine propulsion, and all of its auxiliary systems will rely on electrical power rather than steam. This change is expected to realize significant lifecycle cost savings. Ship construction is proceeding as scheduled with a contract delivery date of summer 2007.

LHA(R)

The fiscal year 2006 budget requests $150 million of advance procurement funds for LHA(R) that support an accelerated ship construction start in fiscal year 2007. LHA(R) is the replacement program for four aging LHA Class ships that reach the end of their administratively extended service life between 2011 and 2015. LHA(R) Flight 0 is a modified LHD 1 Class variant with improved aviation capabilities designed to accommodate aircraft in the future Marine Corps Air Combat Element including JSF and MV–22 and provides adequate service life for future growth.

Joint High Speed Vessel (JHSV)

The Navy High Speed Connector has been merged with the Army Theater Support Vessel to form the JHSV program. This program will provide a high-speed intra-theater surface lift capability gap identified to implement Sea Power 21 and the Army Future Force operational concepts. The JHSV will be capable of support-

ing Joint Force needs for flexible, fast transport of troops and equipment for the future. Today's only alternative to meeting this gap is through the leasing of high speed vessels for rapid troop and equipment transport is airlift. The WestPac Express is a high-speed surface vessel currently being leased by the Military Sealift Command and used to transport Marines in the Western Pacific operating area. With the Navy designated as the lead Service, the Navy, Marine Corps, and Army are working together to develop the required documentation to meet a Milestone A decision in February 2006 with a lead ship contract award planned for fiscal year 2008.

KC–130

The fiscal year 2006 budget requests $1,093 million for 12 KC–130J aircraft. These aircraft will be procured under an existing Air Force multi-year contract. The Marine Corps has taken delivery of 16 KC–130J aircraft to date, with five more deliveries scheduled for fiscal year 2005. Twelve aircraft are planned for procurement in fiscal year 2006 to bring the total number of KC–130J aircraft to 33. The KC–130 fleet once again proved itself as a workhorse during operations in Iraq. The KC–130J provides major enhancements to the current fleet of KC–130s, extending its range, payload, and refueling capabilities. The first KC–130J squadron (12 aircraft) has achieved IOC and will immediately be deployed in support of the global war on terror. Bold steps in simulator training and joint flight instruction place the KC–130J program on the leading edge of the transformation continuum. Additionally, we have continued to ensure the tactical capability of our existing KC–130F, R, and T series aircraft by installing night vision kits and upgraded aircraft survivability equipment.

C–40

The fiscal year 2006 budget requests $10.3 million to support delivery of C–40 (Boeing 737–700C) aircraft previously funded. The C–40 replaces the aging C–9 aircraft providing intra-theater logistics support. To date, the Navy has taken delivery of eight C–40s with one more on contract. An additional six are planned for procurement in the FYDP.

COMMAND, CONTROL, AND NET-CENTRIC CAPABILITIES

Deployable Joint Command and Control

The DJC2 system is one of SECDEF's three top transformational initiatives to equip Combatant Commanders with a scalable, standardized joint C2 system that can be deployed on short notice. This Navy led effort serves as an example that rapid acquisition is achievable. DJC2 was required to deliver an IOC within 18 months of program start and we remain on schedule.

Joint Tactical Radio System (JTRS)

We are working with the Air Force to successfully converge development of Navy and Air Force versions of JTRS (JTRS–AMF) to provide a common acquisition approach. Closely coupled with the JTRS Program and building on the initial Multifunctional Information Distribution System (MIDS), we have developed a promising joint effort with the Air Force that will significantly improve interoperability to the cockpit and maintain alignment with our tactical radio transition to the JTRS environment. This effort also has four international partners who are paying participants in the program.

Mobile User Operating System (MUOS)

The Department remains a strong participant in the National Security Space Program with our new start MUOS UHF Satellite Program that exhibits all the capabilities needed to ensure compliance with the DOD Net-centric models and regulations. Our SPAWAR Space Field Activity that supports the National Reconnaissance Office (NRO) is strong and very effective in identifying collaborative opportunities for Navy-NRO partnerships.

Cooperative Engagement Capability (CEC)

The fiscal year 2006 President's budget requests $88.1 million for continued development of the Navy's CEC. CEC provides a significant step forward in transforming our situational awareness of the battlespace. CEC's successful completion of OPEVAL allows implementation of this capability within the fleet and is a major step in developing a network-centric force. The CEC program has been restructured to achieve alignment with the Navy's OA plans as well as to meet forthcoming requirements from the Joint Single Integrated Air Picture Systems Engineering Organization (JSSEO). A revised acquisition strategy reflecting this restructured ap-

proach was approved August 18, 2004. This revision included the implementation of a pre-planned product improvement (P3I) approach to modify the current equipment to meet reduced size, weight, cost power and cooling objectives. The P3I approach will also implement the existing Navy design objective with regard to open systems, interoperability and program protection. By the end of fiscal year 2006 a total of 40 shipboard and 5 squadrons will be equipped with CEC. The fiscal year 2006 budget request $40.3 million to procure 5 additional CEC systems. The acquisition strategy also outlines the implementation of a single-track management solution set for Navy systems that will incorporate the IABM from JSSEO. This will maximize the potential for joint interoperability across the battlespace. We are currently in the process of competitively selecting a System Integrator/Design Agent to implement the developed track management solution set across the fleet.

Distributed Common Ground System—Navy (DCGS–N)

A further step forward in network-centric warfare and one of the Navy's transformational initiatives is DCGS–N. In January 2004, the Navy combined the Joint Service Imagery Processing System—Navy with the Joint Fires Network into DCGS–N. These programs were combined organizationally, programmatically, and technically. The fiscal year 2006 budget request includes $12.4 million for continued DCGS–N development. This capability merges ISR, targeting and command and control systems into a coherent architecture to improve situational awareness, fires and time-sensitive targeting. It serves as a building block for the Navy's more extensive FORCEnet concept.

E–2C and Advanced Hawkeye (AHE)

The E–2C AHE is a critical enabler of transformational intelligence, surveillance, and reconnaissance, providing a robust overland capability against current and future cruise missile-type targets. The AHE program will modernize the E–2 platform by replacing the current radar and other system components to maintain open ocean capability while adding transformational surveillance as well as theater air and missile defense capabilities. The fiscal year 2006 budget requests $249 million to procure two TE–2Cs in the third year of a 4-year MYP. This effort will keep the production line viable while the AHE, formerly known as the Radar Modernization Program, continues spiral development toward an Initial Operational Capability in fiscal year 2011. The AHE program continues to execute the SDD program of record. Further, OA standards are being integrated into E–2C aircraft and AHE program to enhance interoperability with DOD systems.

Unmanned Aerial Vehicles (UAV)

The global war on terror continues to place emphasis on the importance of UAVs. The fiscal year 2006 budget request reflects our commitment to a focused array of UAVs that will support and enhance both surveillance and strike missions with persistent, distributed, netted sensors.

Fire Scout UAV

The fiscal year 2006 budget requests $77.6 million to continue development of the Fire Scout UAV. The Fire Scout is a Vertical Takeoff and Landing Tactical UAV (VTUAV) designed to operate from all air-capable ships, carry modular mission payloads, and operate using the Tactical Control System and Tactical Common Data Link. The Fire Scout UAV will provide day/night real time ISR and Targeting as well as communication-relay and battlefield management capabilities to support core Littoral Combat Ship (LCS) mission areas of ASW, MIW and ASUW for the naval forces. Upgrades will include a four-bladed rotor and increased payload capacity. Upgraded Fire Scout capability will be fielded with LCS Flt 0.

The Army has selected the Fire Scout for their Army Future Combat System Class IV UAV. Numerous similarities in hardware components, testing, logistics, training, software and support requirements, offer potential for overall program cost reduction which would clearly benefit both the Army and Navy. We expect to sign a MOA with the Army for the acquisition of the Fire Scout airframe, and selected subsystems on a single Navy contract. The airframes will be subsequently modified to Service specific requirements under separate existing Navy and Army contracts. The goal is to maximize common support opportunities, eliminate redundant costs, maximize common avionics and sensor configuration to promote interoperability, and eliminate redundant tests.

Vertical Unmanned Air Vehicle (VUAV).

UAVs have played a critical role in recent operations and are also a key element of our transformation. The Marine Corps is pursuing the replacement of its almost 20-year-old Pioneer UAV system that has flown over 6,950 hours in support of OIF

highlighting the criticality of these systems for our Marine forces. Requirements for VUAV are being developed in consonance with Ship to Objective Maneuver concepts from Expeditionary Maneuver Warfare, the naval concepts of Sea Basing and Seapower 21, and with lessons learned from recent operational experience. The fiscal year 2006 budget requests $9.2 million to evaluate the Eagle Eye UAV, currently being developed by the United States Coast Guard in connection with its Deepwater Program. The Department will also continue to evaluate the capabilities of Fire Scout for this mission, seeking commonality within the Department.

Joint Unmanned Combat Air System (JUCAS)

The fiscal year 2006 budget realigns funding to the Air Force to establish a Joint Program Office with Navy representation to advance the JUCAS Program. The Department is committed to a JUCAS initiative, developed in partnership with the Air Force and the Defense Advanced Research Projects Agency. The Navy and the Air Force have defined a common set of science and technology requirements that recognize the unique needs of each Service that will form the basis for developing air vehicles that will contribute to a joint warfighting concept of operation.

OTHER SIGNIFICANT CAPABILITIES

Presidential Helicopter Replacement Aircraft (VXX)

The fiscal year 2006 budget requests $936 million RDT&E for SDD efforts for the VXX program. The goal of this accelerated program is to introduce a new Presidential helicopter by October 2009. The VXX program will utilize an evolutionary acquisition approach through a two-part incremental development to deliver a safe, survivable, and capable vertical lift aircraft while providing uninterrupted communications with all required agencies. The Department completed a Milestone B/C Defense Acquisition Board on January 13, 2005, and on January 28, 2005, a contract was awarded to LMSI to proceed into SDD and Pilot Production of the first increment aircraft.

Technology

Technology will never substitute for presence; rather it should always address a mission requirement of making naval forces more effective. The fiscal year 2006 budget requests $1.78 billion for a science and technology (S&T) portfolio designed to provide the best scientific research and technology in the shortest time to maximize the benefit to our sailors and marines.

Efforts on behalf of Tomorrow's Fleet/Force—largely technology development—are organized in terms of a series of Future Naval Capabilities (FNCs) that focus on major technical barriers challenging the Navy and Marine Corps in transforming themselves for 21st century operations. Components and systems developed to solve the operational problems defined by the FNCs are evaluated in feasibility demonstrations, prototypes, and field trials, with the results made available to Navy system developers. FNCs are fully integrated with Navy and Marine warfighting requirements and budget-development processes.

The fiscal year 2006 budget requests funding to develop several Innovative Naval Prototypes (INPs). These initiatives include an electromagnetic railgun prototype; new concepts for persistent, netted, littoral anti-submarine warfare; technologies to enable Seabasing; and the naval tactical utilization of space. INPs represent revolutionary "game changers" for future naval warfare.

SEA TRIAL AND SEA VIKING

Experimentation

Identifying and developing future capabilities for naval forces will require robust experimentation involving systems, platforms, organizations, and tactics. The Navy's Sea Trial and Marine's Sea Viking experimentation elements of our Naval Power 21 strategy give the Fleet a strong voice in evaluating the potential of new technologies and warfighting concepts. Extensive use of simulations, modeling, joint test facilities and actual forces is necessary to maintain our technical advantage and continual command of the seas. The Sea Viking 04 wargame recently conducted by Joint Forces Command examined many of the issues surrounding Forced Entry operations from a coalition Sea Base. Sea Viking 06 is the next experimentation platform that is developing Distributed Operations and will be using or simulating many of the technologies and systems we are discussing today.

Sea Trial and Sea Enterprise in Action: Operation Respond

In support of the I Marine Expeditionary Force's (I MEF) return to Iraq and in support of deployed Marines in Afghanistan, the Secretary of the Navy established

a formalized process and action team, Operation Respond, to rapidly respond to technological and materiel requirements generated from deployed marines. A senior Navy Marine Corps team co-chaired by the Assistant Secretary of the Navy (Research, Development and Acquisition) and the Deputy Commandant for Combat Development reviews and coordinates technical and materiel requirements for deployed units and utilizes the technical and engineering expertise throughout the DON and industry to expedite the best solutions available to counter rapidly evolving threats. This process served I MEF well in the initial year of deployment to OIF and OEF. The DON is establishing a Naval Innovation Lab environment to develop innovative ways to meet emerging technology problems within the global war on terror. This effort under the ASN (RDA) will leverage and expand the current roles and capabilities of our established requirements generation and materiel development and acquisition commands in order to better respond to innovative enemy threats.

Counter-Improvised Explosive Devise (IED) Technology, Equipment, and Operations

The Department has reprogrammed over $28.0 million in fiscal years 2004 and 2005 for the testing, assessment and fielding of technology and equipment to counter and exploit the IED threat. Specific focus areas include joint, manportable explosive ordnance disposal (EOD) and intelligence, surveillance, and reconnaissance robots, IED electronic countermeasures, backscatter X-Ray systems, specialized search dogs and establishing and maintaining an IED countermeasures group at our Naval EOD Technical Division, Indian Head, Maryland. This group is responsible for support to the joint, forward-deployed, and CONUS-based IED exploitation cells, analysis of tactical and technical IED threats, development and dissemination of EOD threat advisories and EOD tactics, techniques and procedures, and provision of technical and training support to EOD operational teams. The Marine's IED Working Group coordinates closely with Naval EOD Technical Division, the Army's IED Task Force, and the Joint IED Defeat Integrated Process Team.

Vehicle Hardening

We reprogrammed $144 million in fiscal year 2004 funds and an additional $77.7 million of Marine Corps personnel funds in fiscal year 2005 to support various Marine Corps vehicle-hardening programs. Additionally, $90.1 million was provided from Operation Iraqi Freedom funds to supplement and accelerate fulfillment of armor requirements through June 2005. Throughout this effort, both the Marine Corps Systems Command and the Marine Corps Warfighting Lab have worked with the Army Developmental Test Command to rapidly test and assess various ballistic materials to include ballistic glass, armor, and ceramic materials for use in vehicle hardening. To date, over 5,000 vehicles have been hardened with various combinations of interim armor to production armor kits. Other vehicle hardening initiatives include the development of an Explosion Resistant Coating (ERC) and a gunner shield. ERC is a polymer coating material that provides an additive lightweight blast and ballistic protection for conventional armor. An innovative, joint testing linkage was established between the Marine Corps Warfighting Lab, Naval Surface Warfare Center Dahlgren, United States Air Force Research Lab, and the Technical Support Working Group to rapidly test the efficacy of ERC as a ballistic material for protecting vehicles. Testing was completed for HMMWV protection from small arms, IED, and mine attacks. ERC is deployed in Iraq on 120 HMMWV interim armor sets. Gunner shields provide an armored turret as an additional level of protection for exposed vehicle gunners operating in HMMWVs and Medium Tactical Vehicle Replacements to date just under 1,900 have been fielded to forces in Iraq. ERC in multiple configurations with added composites may provide a lighter and promising ballistic protection when applied to vehicles. Testing and analysis is currently underway. Initial testing of ERC has demonstrated a lighter level of protection can be attained. We are committed to fully exploring ERC options.

Intelligence, Surveillance, and Reconnaissance (ISR)

The Marine Corps is engaged in initiatives to provide enhanced ISR capabilities in theater. The Dragon Eye UAV is in full-scale fielding and the Marine Corps is working to conduct an Extended User Assessment of the Silver Fox UAV system. The Marine Corps is in the process of creating requirements for a Tier II UAV system to provide an organic UAV to the Infantry Regiment. The I MEF Scan Eagle services lease had codified a capability gap at this echelon and the Marine Corps Warfighting Lab is coordinating with Marine Corps Combat Development Command to find a long-term solution. The Marines have also employed aerostat balloon platforms to provide persistent ISR capability.

Aircraft Survivability Equipment (ASE)

As a result of Army aviation lessons learned, Navy and Marine Corps aviation staffs undertook a coordinated rapid fielding initiative of more than $152 million to upgrade ASE for Marine aviation units, preparing to deploy to Iraq in 2004. These efforts focused on ASE to counter infrared manportable missiles and small arms being employed by insurgents in more advanced anti-aircraft tactics. As a result of the focused efforts by our Navy and Marine Corps aviation maintenance teams and hard-working contractors, every Marine Helicopter engaged in OIF II is today supporting combat operations with upgraded ASE. All deploying aircraft receive the "V2" upgrade to the AAR–47 Missile and Laser Warning Set and the new ALE–47 Countermeasure Dispensing systems; AH–1W aircraft received IR suppressor exhaust modifications to reduce their signatures; AH–1W, UH–1N and KC–130 aircraft have been equipped with the more advanced APR–39AV2 radar detection system; CH–53E aircraft received interior ballistic armor and new ramp-mounted GAU–21 .50 caliber machine guns; existing IR jamming systems on the CH–46E and KC–130 aircraft were upgraded. CH–46 aircraft received the M–240 7.62 caliber machine guns, lightweight armor, and lightweight armored cockpit seats.

REFORMING THE ACQUISITION SYSTEM

The Department is committed to simplifying the acquisition system, streamlining the bureaucratic decision making process and promoting innovation. We continue to take advantage of numerous acquisition reforms to shorten cycle times, leverage commercial products and capabilities, optimize human systems integration and improve the quality of equipment being provided to our warfighters. Price-based and alpha contracting techniques show promise in programs such as the Tomahawk remanufacture program. We use leverage from international involvement in our acquisition programs to reduce our research and development costs and gain economies in production. The Department also seeks to improve its internal business practices and integrate commercial ideas. By improving these practices, we expect to be able to shift more dollars into combat capability and quality of service.

The Department consolidated its directive concerning acquisition with the capabilities development/requirements direction, which contributes to joint capabilities integration and to better communication, cooperation and coordination between the Navy and Marine Corps capabilities development and acquisition communities. In 2004, we worked with industry to identify effective ways, including the use of appropriate profit/incentive arrangements, to encourage improved performance under Navy and Marine Corps contracts. Navy also led the Office of the Secretary of Defense commodity council pilot for strategic sourcing of administrative services, and made wider use of internal contracting centers of excellence and web-enabled contracting vehicles.

ACQUISITION LOGISTICS

Continuous Improvement

The Navy and Marine Corps Team continues to implement several continuous improvement initiatives consistent with the goals of the President's Management Agenda that enable realignment of resources in order to increase our output and re-capitalize our force. The cornerstone of our continuous improvement effort is the education and use of industry proven Lean and Six Sigma efficiency methodologies in our day-to-day operations. Our industrial activities including back office support, fleet leadership and our acquisition community are all embarking on the journey of institutionalizing closed loop continuous improvement practices.

Lean efficiency events that concentrate on increasing velocity and productivity in our Supply, and Aviation Intermediate Maintenance Departments (AIMD) were completed on the U.S.S. *Harry Truman* (CVN 75). The outcomes of these events are impressive from operational and resourcing perspectives. Reductions in supply wait times and maintenance turn-around-times exceeded 50 percent. The benefit and migration to all afloat AIMDs will allow us to improve our afloat processes and influence our future manning requirements on CVN 21 Class carriers. These were the first Lean events conducted on Navy warships. Our planning, logistics, and maintenance activities are receiving intense Lean and Six Sigma training as every improvement workshop to date has yielded order of magnitude improvements. Our Sea Systems Enterprise commenced Task Force Lean. Our Aviation Enterprise continues to yield excellent results with AIRSpeed initiatives. Our Submarine enterprise through Team Submarine is making great progress in targeting and leaning our current processes. The acquisition community commenced initiatives that have a goal to reduce the volume of acquisition related paperwork by 50 percent and reduction in paperwork cycle time down to 90 days.

Another pillar of continuous improvement is the shaping of our business operating systems. Our Converged Enterprise Resource Planning (CERP) program entered into the System Development and Demonstration phase in September 2004, and is expected to initially deploy in fiscal year 2006. The core of this system is SAP. Supply, Maintenance, Business Operations and Financial communities will use this integrated software that incorporates commercial best practices. In addition to increasing productivity, the system provides real time information, total asset visibility, compliance with the Chief Financial Office Act, and serves as a forcing function for the integration or sun setting of legacy, standalone systems. The Marine Corps GCSS–MC operating system is also in development stage. It will provide increased asset visibility for our warfighters at our "last tactical mile." These continuous improvement initiatives enable us to increase our combat capabilities with the expectation that we become more efficient, agile, flexible, and reliable at a reduced cost of doing business.

SUMMARY

Our mission remains bringing the fight to our enemies. The increasing dependence of our world on the seas, coupled with growing uncertainty of other nations' ability or desire to ensure access in a future conflict, will continue to drive the need for naval forces and the capability to project decisive joint power by access through the seas. The increased emphasis on the littorals and the global nature of the terrorist threat will demand the ability to strike where and when required, with the maritime domain serving as the key enabler for U.S. military force.

Accordingly, we will execute the global war on terror while transforming for the future fight. We will continue to refine our operational concepts and appropriate technology investments to deliver the kind of dominant military power from the sea envisioned in Sea Power 21. We will continue to pursue the operational concepts for seabasing persistent combat power, even as we invest in technology and systems to enable naval vessels to deliver decisive, effects-based combat power in every tactical and operational dimension. We look forward to the future from a strong partnership with Congress that has brought the Navy and Marine Corps Team many successes today. Thank you for your consideration.

Senator TALENT. John, do you have your discussion about procurement changes and flexible funding? Is that in the statement that you submitted, and if so where is it?

Mr. YOUNG. I am not sure it is in the written statement.

Senator TALENT. It is not in the written statement?

Mr. YOUNG. It should be. Can we locate that and tell you?

Senator TALENT. If it is in the written statement, yes.

Mr. YOUNG. Okay.

[The information referred to follows:]

Flexible funding was not discussed in my written statement. Below is a description of alternative financing approaches for ship procurement that the Navy is exploring.

The Navy's position is that ships, in general, should be fully funded in the year of authorization and appropriations. The Navy should be allowed to continue the practice of advance procurement for long lead materials and design efforts that support delivery schedules and reduce end item cost. However, the Navy recognizes several situations where a financing strategy other than full funding has, or will have, allowed the government to obtain the best possible value for the taxpayer.

Examples of these include:

a. Incremental Funding, used on LHD 8, LHD 6, and SSN 23.This is good for very specific types of hulls, which are built at a rate of less than one per year and where design changes during construction are anticipated.

b. Two-Year Split Funding, used, or planned for, on CVN RCOH, CVN 21, and LHA(R). Used to procure large capital ships with a production rate of less than one per year. Allows the Navy more efficient and effective use of Navy Total Obligation Authority for the SCN account.

c. Incremental Detail Design in SCN(AP), used, or planned for, on VA SSN, CVN–21, DD(X), and MPFF. Allows efficient execution of Detail Design and an early start of construction on lead ships.

d. Lead Ship in RDT&E. Used on LCS, requested but rejected by Congress for DD(X). Allows for maximum flexibility in inserting new technology and overcoming cost growth as the design is matured.

While full funding, in general, is important to maintain fiscal discipline, the Navy believes it should have enough flexibility to employ financing strategies other than full funding when doing so represents a path to better overall value to the taxpayer, helps to maintain the industrial base, and supports CNO priority to deliver needed assets to the Fleet faster and better in order to achieve our mission of Sea Strike, Sea Shield and Sea Basing and support the global war on terrorism.

You and the members of the committee have played a personal role in all of this progress and I offer my great thanks on behalf of the Department, the Nation's marines and sailors for your insight, leadership, and support. We look forward to the chance to answer your questions.

Senator TALENT. Thank you.

Admiral Sestak.

STATEMENT OF VADM JOSEPH A. SESTAK, JR., USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR WARFARE REQUIREMENTS AND PROGRAMS

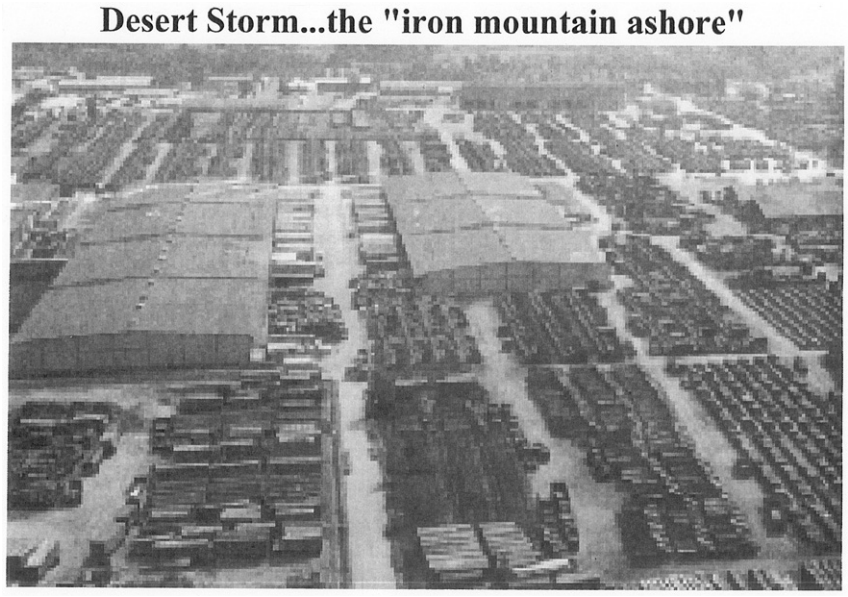
Admiral SESTAK. Thanks, Mr. Chairman. Mr. Chairman, I appreciate that at the beginning of this hearing you mentioned that you wanted us to talk a bit about the seabasing concept. To some degree I think the military is obligated to come over here and explain to what function do we serve society so that we might be maintained. I think the first person that I was aware of that spoke about seabasing was Samuel Huntington from Harvard University back in 1954, where in an era of massive retaliation, where each of us, we and the Soviet Union, both relied on a nuclear weapons deterrent, he stated that the Navy's function serving our society is to use the seas as a base, not to command or gain command of the seas, but rather to use the seas to gain conventional supremacy on land.

So I want just to take 3 minutes out and talk about the seabasing concept. It is important to note: to what end does the Navy serve this Nation. Today we have 85 percent of the value of all international trade and 99 percent of the volume sitting at sea. Businesses' warehouses are sitting at sea today. Two-thirds of our economic growth recently has been because of our exports. So to some degree, if for no other reason, it is worth having a Navy to "keep the dog on the porch," to make sure no one interrupts this commerce that fuels our Nation in what is a public commons, the seas, where anyone can be legally at any moment.

But you get a "two-for" from the Navy, being forward, protecting our economic commerce, the dog that does not bark. That is, a Navy that can reach out, as it did in 1988, at a moment's notice and touch a Qadafi in Libya, or reach out, as it did in 1998, to reach into Afghanistan and Somalia simultaneously to strike against terrorism.

But the third thing that this Nation gains from the Navy is access. That is what I think you are aware of, Mr. Chairman, when you were talking about a concept that then can come down to programs, such as the Maritime Prepositioning Force. If I could just hold up three short slides to say that as we are talking about the seabasing concept it is important—and I passed these out to your staffer—that this [indicating] is what we are trying to prevent. This is a picture in Operation Desert Storm. This is a Marine brigade or an Army division—unloading ashore.

[The information referred to follows:]

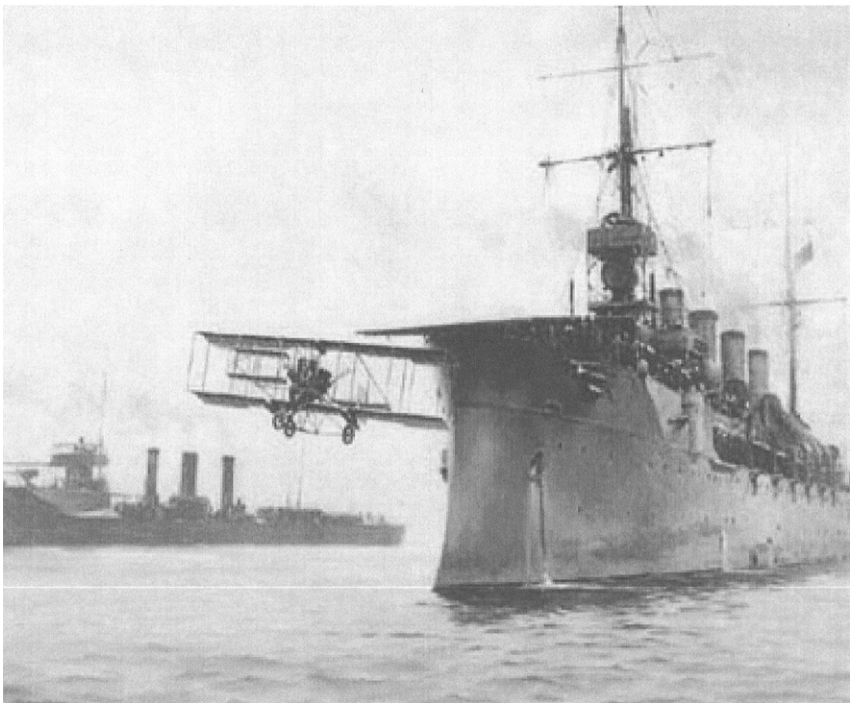


This is also how we fought the last war, Operation Iraqi Freedom (OIF). We sat there and stockpiled our forces ashore until we were ready to go on the offensive. In 1991, Saddam shot a Scud missile that just missed this formation. There will be no nation in the future of any heft that will ever permit us to build up our forces ashore.

So the question in seabasing is how do I marry up this brigade at sea and put it ashore without permitting a buildup, that it goes ashore ready to fight? That is the challenge that you have seen the Navy and the Marine Corps come to grips with with the seabasing concept the last 2 years.

Second, this picture right here is 1910. This is 1910; this was the first flight in Hampton Roads of a plane from an aircraft carrier.

[The information referred to follows:]



Thirty two years later, the very first time we used a carrier in anger happened today, 63 years ago on the Doolittle raid. We jointly launched the U.S. Air Force off an aircraft carrier, a sovereign piece of American territory off Japan, because we had no other way to strike against the country because we had no bases except the sea from which to strike.

The importance of this is not that we struck Japan. The importance is it took us about 32 years to get it right. I came back from sea with a battle group from the Persian Gulf a little less than 2 years ago. I could not have explained to you, Senator, what an MPF ship was. But in 2 years I have seen, working equally with our Marine Corps, that we are beginning to not only think the unthinkable and fathom the unfathomable, as some people say, but we are beginning to "pay cash" on this concept.

So today I am ready to explain to you the programs by which we are able to now execute this vision, I believe, that is as innovative as the idea of putting an aircraft at sea, was; now, we are putting this "pile of iron" at sea and deploying it ashore.

The very last slide is this one—this is an amphibious assault.

[The information referred to follows:]

This is similar to how we did it in Guadalcanal and Normandy. In the future we may very well do that also. But the point is this: If a marine gets on a ship in San Diego, it takes upwards of 4 weeks to assemble a large amphibious task force off a nation like Korea and insert it ashore. We can be there 60 percent faster and with 40 percent more force, if MPF(F), much like that aircraft carrier that launched in 1910 off Hampton Roads, loads out the way that we as a team are about to present you as the seabasing concept.

Thank you.

[The prepared statement of Admiral Sestak follows:]

PREPARED STATEMENT BY VADM JOSEPH A. SESTAK, JR., USN

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's Fiscal Year 2006 Seabasing programs.

The current and future security environments have become increasingly challenging to U.S. and allied interests because of regional security issues, the concern with terrorism globally, the expanded influence of non-state actors and the proliferation of weapons of mass destruction (WMD). As the U.S. security strategy for the 21st century evolves, our Nation remains committed to its global responsibilities to ensure national security through peace, prosperity and freedom. However, U.S. options to extend global influence through forward basing of military capability are diminishing. Potential enemies may be likely to strike U.S. bases abroad in a conflict with increasingly lethal weapons, including WMD that are either developed by indigenous industries or purchased abroad. Many nations may find it politically untenable to host U.S. bases or allow access through their territory. The strategic challenge for our National and military leaders will be to maintain a global presence for security in the face of decreasing access overseas.

SEA POWER 21

The objective of Sea Power 21 is to ensure that our Nation possesses credible combat capability on scene to promote regional stability, to deter aggression throughout the world, to assure access of joint forces and to fight and win should deterrence fail. Sea Power 21 guides the Navy's transformation from a threat-based platform

centric structure to a capabilities-based, fully integrated force. The pillars of Sea Power 21—Sea Strike, Sea Shield, Sea Base—are integrated by FORCEnet, the means by which the power of sensors, networks, weapons, warriors and platforms are harnessed in a networked combat force. It is this networked force that will provide the access with the strategic agility and persistence necessary to prevail in the continuing war on terror, as well as the speed and overwhelming power to seize the initiative and swiftly defeat any regional peer competitor in combat operations.

The Navy of the future must be capabilities-based and threat-oriented. While the fabric of our fighting force will still be the power and speed needed to seize the initiative and swiftly defeat any regional threat, FORCEnet's pervasive awareness (C^4ISR) will be more important than mass. Because of its access from the sea, the Navy and Marine Corps are focusing significant effort and analysis in support of joint combat power projection by leveraging this traditional access provided by the oceans through Seabasing, with the access now provided by space and cyberspace through FORCEnet. It is the synergistic access provided by these great "commons"—the sea and space and cyberspace—that is the revolution of the future.

To this end, the technological innovations and human-systems integration advances in future platforms remain critical. Our future warships will sustain operations in forward areas longer, be able to respond more quickly to emerging contingencies, and generate more sorties and simultaneous attacks against greater numbers of multiple aim points and targets with greater effect than our current fleet. However, the future is about the capabilities posture of this fleet, which is why the future is also about establishing C^4ISR as a warfighting weapon and integrator from the sea . . . and understanding the impact of changing C^4ISR investment strategies on the warfight, in particular as it enhances our ability to project power from the seabase.

SEABASING VISION

Today's U.S. strategic guidance requires secure strategic access and the freedom to act globally. However, during periods of crisis, combatant commanders will need the capability to contain the crisis by deterring potential adversaries or seizing the initiative to swiftly defeat enemy actions. Given the likely operational environment, the Joint Force Commander (JFC) must be able to project power when forward basing may not be available. Even where forward bases are otherwise available, their use may be politically undesirable or operationally restricted for military use, and the JFC may desire to reduce the footprint and visibility of the joint force. Where potential air, sea, and land entry points are available, their predictability may allow the enemy to focus his anti-access capabilities against our forces. In addition, they may be a source of friction in some coalition situations and present security challenges that theater operational objectives.

Seabasing is one of several evolving Joint Integrating Concepts that will be a critical capability for joint forces in 2015–2025 that significantly increases options while decreasing liabilities, both militarily and politically. Projecting and sustaining joint combat power from the seas, Seabasing assures joint access by leveraging the operational maneuver of sovereign, distributed, and networked forces operating globally. Seabasing capitalizes on the maritime dominance gained by our Nation's forces, and uses the maneuver space and freedom of action afforded by the sea, space and cyberspace to project and sustain joint combat power from an inherently mobile aggregation of distributed and networked platforms. There are seven overarching principles that are essential to applying the Seabasing concept across a wide range of scenarios:

- Use the sea as maneuver space. Seabasing exploits the freedom of the high seas to conduct operational maneuver in the maritime (to include littoral) environment relatively unconstrained by political and diplomatic restrictions, for rapid deployment and immediate employment. Sea based operations provide JFCs with an operational flexibility to support the immediate deployment/employment/sustainment of forces across the extended depth and breadth of the battlespace.
- Leverage forward presence and joint interdependence. Joint forces operating from the sea base, in conjunction with other globally based joint forces, provide the JFC an on-scene, unconstrained, credible offensive and defensive capability during the early stages of a crisis. Combined with other elements of this joint interdependent force, forward deployed joint forces can help to deter or preclude a crisis or enable the subsequent introduction of additional forces, equipment, and sustainment.
- Protect joint force operations. Seabasing provides a large measure of inherent force protection derived from its freedom of operational maneuver in

a maritime environment. The combined capabilities of joint platforms in multiple mediums (surface, sub-surface, and air) provide the joint forces a defensive shield both at sea and ashore. The integration of these capabilities and freedom of maneuver effectively degrades the enemy's ability to successfully target and engage friendly forces while facilitating joint force deployment, employment, and sustainment.

• Provide scalable, responsive joint power projection. Forces rapidly closing the sea base by multi-dimensional means (air, surface, and subsurface) give the JFC the ability to rapidly scale and tailor forces/capabilities to the mission. Seabasing provides an option to the JFC to mass, disperse, or project joint combat power throughout the battlespace at the desired time to influence, deter, contain, or defeat an adversary.

• Sustain joint force operations from the sea. Sea based logistics entails sustaining forces through an increasingly anticipatory and responsive logistics system to support forces afloat and select joint/multinational forces operating ashore. The sea base is sustained through the interface with support bases and strategic logistics pipelines enabling joint forces to remain on station, where needed, for extended periods of time. Seabasing uses selective off-load to assemble and deliver tailored sustainment packages directly to joint forces operating ashore.

• Expand access options and reduce dependence on land bases. Seabasing integrates global power projection capabilities with sea based power projection capabilities to provide the JFC with multiple access options to complement forward basing in the Joint Operating Area (JOA), and reducing reliance on forward basing if the security environment dictates. This includes theater access capabilities at improved and unimproved ports and airfields.

• Create uncertainty for our adversaries. Seabasing places an adversary in a dilemma through the conduct of dispersed and distributed operations. The options of multiple points and means of entry require an adversary to either disperse or concentrate his forces, creating opportunities to exploit seams and gaps in his defenses.

These seven overarching principles guide the development of the Seabasing Concept and address how Seabasing will be employed by the future Joint Force. Seabasing is the capability to shape a strategic environment, to be rapidly employed in the global war on terror, and to win decisively in a major conflict—using the world's greatest maneuver area, the seas, to project its power.

SEABASING OPERATIONAL PRINCIPLES

In order to deliver credible combat power across the full spectrum of potential future military operations, the Seabasing Vision must be operationalized. This requires tying together the right Joint capabilities, in the right manner, to pursue operational and tactical objectives contributing to overall strategic goals. Seabasing allows the JFC to do this with minimum, or without, reliance on forward airfields or ports, providing tremendous operational flexibility. The key operational principles that make Seabasing a national asset to pursue national goals are laid out below:

• Military Access. Joint forces need to be able to flow into and out of a theater of operations as the operational tempo requires and the threat dictates. Among the other strike groups, our forward deployed Carrier Strike Groups (CSGs) and Expeditionary Strike Groups (ESGs) with their supporting surface combatants and submarines provide a robust capability to ensure access from the Sea Base in non-permissive environments. Assured access in a theater of operations is key not only for naval forces, but for the Joint Force, and Seabasing acts as a Joint portal through which a Joint Combat Force can assemble the appropriate mix of capabilities required to ensure missions success at a time and place of its choosing. It is important to note that this access is not just from the seas, but it is also gaining access to information and intelligence through surveillance and reconnaissance, preparing the battlespace with credible combat power to shape—that is, deter or dissuade—an adversary from acting against U.S. or allied interests. These attributes define Seabasing as a true national capability.

• Distributed. Seabasing will take advantage of the global commons—the sea, space and cyberspace—to expand our dominance throughout the battlespace. The JFC will be able to mass effects, rather than forces, keeping open alternate avenues of approach and forcing adversaries to remain off balance. With deep operational reach, we will be able to mask our intentions and rapidly apply combat power to either interdict terrorists without

warning, or to preempt enemy action. Broad-Area Maritime Surveillance (BAMS), Unmanned Aerial Vehicles (UAVs), Multi-mission Aircraft (MMA) patrol aircraft, Aerial Common Sensor (ACS) intelligence aircraft, JSF operating from the follow-on large-deck amphibious assault ship (LHA(R)), and Advanced (E–2C) Hawkeye (AHE) operating from CSGs all provide the critical ISR and command and control necessary to rapidly survey this massive and distributed battlespace so forces can react quickly and decisively when required.

• Netted. In order to be distributed, we must be netted; netted in the combat forces' pervasive awareness of the battlespace; in their ability to communicate across that battlespace; and netted in the control of forces and effects throughout the battlespace. This is a Joint net where, for example, USAF global strike aircraft can seamlessly flow into and out of the battlespace; this is a Joint net where Army Styker Brigades can call for supporting fires from DD(X) long range advanced gun systems (AGS), or USMC Joint Strike Fighter (JSF) flying from LHA(R). The rationale to close the well deck on LHA(R) and increase its aviation strike capability was central to delivering a more lethal force and increasing the nodes within the Joint combat network. Additionally, this joint net will be enhanced as Special Operations Forces are inserted by cruise missile-equipped submarines (SSGNs), and then call for strikes conducted covertly by SSNs and SSGNs with Tactical Tomahawk (TACTOM) land attack missiles. FORCEnet, with its constellation of Mobile User Objective System (MUOS) and Tactical Satellite (TSAT) space platforms, Joint Tactical Radio System (JTRS) radios, and tactical data links will be key enablers for coordinating distributed operations in a netted environment.

• Greater Operational Availability. The ability to rapidly assemble seabasing requirements with robust capabilities is inextricably linked with Operational Availability and the sustainment of our Joint forces. Seabasing is enhanced and enabled by improving our force posture and having the right forces forward at the right time—presence with purpose. This includes aggressively using our Forward Deployed Naval Forces (FDNF), Sea Swapping crews with our deployed ships and maintaining the readiness required to quickly surge naval forces in accordance with Fleet Response Plan (FRP) policies. Operational availability is also enhanced by the Maritime Preposition Force (Future) (MPF(F)) ships, which rapidly bring at sea arrival and assembly of significant ground combat power. This is ground combat power that can be used for Joint Forcible Entry Operations (JFEO), in stability operations, global war on terrorism missions, or in support of humanitarian operations seen in Operation Unified Assistance (the tsunami relief efforts). MPF(F) delivers the JFC the capability to conduct rapid and decisive combat operations across a wide spectrum of challenging national objectives.

• Joint Transformation. As Seabasing matures and grows in its sophistication in Joint operations, it will further enhance transformation for the other Services. The Army and Air Force will rely on Seabasing when they consider combat lift, force employment, and sustainment and force protection. This serves as the foundation for capabilities-based, threat-oriented force planning—not platform or Service-centric planning. The JFC will be able to consider flowing U.S. Army distributed maneuver forces and their logistics through the Sea Base, utilizing the Theater Support Vessels (TSVs) and High-Speed Vessels (HSVs). These transformational platforms, coupled with the robust Sea Shield that Cooperative Engagement Capability (CEC) of the surface combatant force (DDGs, DD(X), CG(X)) and the CSG air wing, exploit the advantages of speed and maneuver. The projection of Sea Shield will not only exist at sea, but deep overland. Overland defense will be further enhanced by Naval and Air Force offensive counter-air (OCA) and suppression of enemy air defense (SEAD). Along with Air Force strategic tanking, Joint Forces from the sea will have persistence and reach unparalleled in past combat operations.

• Capabilities Based . . . Threat Oriented. As the operational principles above demonstrate, Seabasing will cause JFCs and their planners to focus on capabilities, not platforms. They will plan and conduct parallel operations from vastly different operational approaches. They will synchronize across a massive battlespace with increased precision and lethality. They will think in terms of theater-wide force protection and sustainment. The overall impact is that Seabasing will drive transformation; a transformation that delivers the combat power tailored for the threat, rather than just what is available.

The future security environment and battlespace will be complex, uncertain, ambiguous, and volatile. Seabasing offers the JFC strategic options he has not had in the past due to uncertain access and basing rights. Our robust military capabilities can be assembled and poised for action without being subject to the constraints and restraints often imposed in the past by neutral and allied nations alike. When the security situation requires American commitment and presence, whether to ensure the free flow of commerce, to strengthen diplomatic actions, or to demonstrate political will, Seabasing—characterized by the principles above—provides the Nation the capability to assemble the joint forces needed to attain the desired end state.

SEA BASE CONCEPT OF OPERATIONS—THE MARITIME PREPOSITIONING SHIP OF THE FUTURE MPF(F)

Our Sea Base Concept of Operations is a Global Concept of Operations which employs a flexible force posture that includes Carrier Strike Groups (CSGs), Expeditionary Strike Groups (ESGs), surface and submarine strike groups, and logistics groups, among others. These strike and support groups are capable of responding across the spectrum of conflict simultaneously around the world. From the period prior to the onset of a crisis through the completion of stabilization operations, Joint Seabasing provides scalable power projection options to the Joint Force Commander. These capabilities provide a framework for the range of employment options available to the JFC through Joint Seabasing. With regard to forcible entry and the employment of MPF(F) in the future, the five tenants of Seabasing are:

a. Close—rapid closure of joint force capabilities from within, or to, an area of crisis. This force, a Marine Expeditionary Brigade (MEB) deploys from the United States to the MPF(F) via two principal means—high-speed sealift and strategic airlift. Strategic airlift is used to fly the marines to a forward base to embark MPF(F) and marry up with their heavy equipment. Sealift is used to close non-self deploying aircraft, such as CH–53, and its support equipment directly to the Sea Base. The MPF(F) with its embarked marines join up with the high-speed sealift and non-self-deploying aircraft at the Sea Base, as it is underway for rapid assembly, saving time for closure to the theater.

b. Assemble—seamless integration of scalable joint force capabilities on and around secure sea based assets. The critical capability of the future prepositioning force will be selective offload, which will require a "warehouse at sea," with "just in time logistics." This movement of combat and combat support equipment will be executed when required by the Commander, at sea, vice waiting for its assembly at an advanced base ashore or within the Joint Operations Area (JOA). This new capability will dramatically alter the way future forces are employed, and improve their security while they are being assembled for combat. These assembly methods will be executed quickly and in high sea states, with reduced manpower. These methods involve advanced technologies that include:

i. External cargo transfer and movement, including the use of sophisticated modern crane technologies

ii. Internal cargo movement, using modern state-of-the art commercial warehousing techniques, adapted for use at sea

iii. Inter-Modal Packaging systems that support efficient and largely automated external and internal cargo movement

iv. Creative use of internal volume (Internal Broken Stow factor) creating the required space for selective cargo breakdown, movement, and assembly.

Under a robust and properly assembled Sea Shield, assembly for combat will be conducted quickly and without the vulnerabilities associated with assembly at fixed ports and airfields. This transformational capability supports the critical at-sea arrival and sustainment timelines required in future potential major conflict operations. MPF(F) is also uniquely suited to respond on short notice to provide additional combat power in support of the global war on terror.

c. Employ—flexible employment and insertion of scalable joint force capabilities to meet mission objectives supported from the sea base. Integrated power projection includes not only the use of all-weather precision strike throughout the JOA, but also the insertion of ground forces at key objectives selected by the JFC. In order to do so, we will use a mix of vertical and surface assault:

i. Vertical maneuver with rotary-wing platforms (e.g., MV–22 and CH–53) from the MPF(F) expands the options for the JFC. Coupled with JSF from LHA(R) to increase airborne fires, this vertical insertion enables the JFC to employ combat forces deep into austere environments with increased lethality, mobility and survivability.

ii. Simultaneous surface maneuver with the enhanced Landing Craft, Air-Cushion (LCAC(X)) for forcible entry operations from the sea provides additional options for the JFC and supports heavy combat payloads.

The Sea Base must also possess the requisite capabilities to exercise command, control, computer, communications and intelligence (C^4I) functions to support the Marine Air-Ground Task Force (MAGTF) Commander. It must also be able to "size up" to support a JFC or Combined (Coalition) Joint Task Force (CJTF) Commander, potentially as a part of the MPF(F). These command elements will have the capability to exercise command from a forward command platform, using reach-back for support from ashore.

d. Sustain—persistent sustainment of selected joint forces afloat and ashore through transition to decisive combat operations ashore. An essential requirement within the distributed Sea Base is continual sustainment of joint force operations, including selected joint forces operating ashore. The force protection benefit of Seabasing will be to minimize or eliminate an operational pause caused by the buildup of a large lodgment ashore. Preventing this pause will reduce the footprint ashore and move the logistics "tail" to the sea base and within the protection provided by the Sea Shield. Additionally, the extent and degree with which the Sea Base can provide medical care at sea and rapidly move injuries to complex facilities outside the JOA will aid in improved casualty care and increased efficiencies as the Sea Base supports the theater commander in the future.

e. Reconstitute—the capability to rapidly recover, reconstitute and redeploy joint combat capabilities within and around the maneuverable Sea Base for subsequent operations. As follow-on forces enter the JOA, or as the operational situation dictates, the JFC may rapidly transition joint sea-based forces to sequential or follow-on operations through at-sea reconstitution. Rapid reconstitution supports persistent combat operations by eliminating the need to wait for additional forces or new equipment from the United States to support additional operations in another theater of operations.

The bridge to naval transformation is Seabasing, centered on its ability to project, sustain and defend decisive, flexible and credible Joint combat power ashore. Joint combat forces will operate from the Sea Base and the Navy is committed to MPF(F) as the centerpiece and key enabler of the Sea Base. These future Maritime Pre-positioning Ships will serve a broader operational and expeditionary function than current pre-positioned ships, creating greatly expanded operational flexibility and effectiveness. We envision a force that will enhance the responsiveness of the joint team by the at-sea assembly of a Marine Expeditionary Brigade that arrives by high-speed airlift and sealift from the United States to the forward operating locations and directly to the MPF(F), itself. These ships will off-load forces, weapons and supplies selectively while remaining far over the horizon, and they will reconstitute ground maneuver forces aboard ship after completing assaults deep inland; and they will then sustain in-theater logistics, communications and medical capabilities for the joint force for extended periods, and then reconstitute (e.g. maneuver to another theater of operations) to be employed ashore, again, as needed.

SUMMARY

Seabasing is a transformational joint concept that exploits the United States' control of the sea to provide a viable option for the military commander to project joint power. The Joint Sea Base provides the operational "freedom of maneuver" to conduct a full range of scalable military operations. The mission of our Navy remains maintaining "command of the sea" and projecting—while protecting and sustaining—sovereign combat power across the global commons. The increasing dependence of our world on the seas, coupled with growing uncertainty of other nations' ability or desire to ensure access in a future conflict, will continue to drive the need for naval forces and the capability to project decisive joint power by access through the seas. The increased emphasis on the littorals and the global nature of the terrorist threat will demand the ability to apply effective and adequate combat power at the place and time of the Nation's choosing. Seabasing and the application of its operational concept within the Sea Base is a catalyst for transformation—across each Service—and as the key enabler within the maritime domain as a national capability for the U.S. military force.

We look forward to the future from a strong partnership with Congress that has brought the Navy and Marine Corps Team many successes today. We thank you for your consideration.

Senator TALENT. Thank you, Admiral.

General Magnus.

STATEMENT OF LT. GEN. ROBERT MAGNUS, USMC, DEPUTY COMMANDANT FOR PROGRAMS AND RESOURCES; ACCOMPANIED BY LT. GEN. JAMES N. MATTIS, USMC, DEPUTY COMMANDANT FOR COMBAT DEVELOPMENT

General MAGNUS. Mr. Chairman, thank you, Senator Kennedy, and other members for allowing us to relate to you what we are doing with our naval forces and our Marine Corps today. With your permission, we will submit our statement for the record and I would like to defer comments to my shipmate and fellow warrior, Lieutenant General Jim Mattis.

Senator TALENT. Okay. General Mattis.

General MATTIS. Chairman Talent, Senator Kennedy, and distinguished members of the Seapower Subcommittee: As Bob Magnus mentioned, our written statement has been submitted and I ask that it be accepted for the record.

It is our privilege to report to you on how we are meeting today's combat challenges and how we are developing the capabilities to ensure marines remain ready for the future. The Marine Corps remains fully engaged in the global war on terrorism. With 368 marines killed and 3,879 marines wounded in the war on terror, we are keenly aware of our priorities.

Together we stand shoulder to shoulder with young Americans of the Navy and all the Services and in Iraq and Afghanistan with those nations' maturing security forces. Our marines are performing extremely well, due in no small part to the support we have received from Congress. The war's operational costs are funded through supplemental appropriations. Internally, we have reorganized to stand up additional units designed to prosecute this fight. We have cross-leveled equipment and rapidly fielded equipment in response to our warfighters' emerging requirements. By adapting our training to lessons learned from the battlefield, we are successfully staying ahead of the enemy.

Further, we deeply appreciate the end strength increase you authorized and appropriated. Our greatest asset and the focus of our effort is the individual marine, whose intellect, physical capabilities, morale, and will consistently outperform the enemy.

Your support has enabled the quick fielding of equipment and technology that address threats across the detect, collect, interrupt, and mitigate force protection continuum. In particular, rotary wing aviation survivability equipment, the evolution of our vehicle hardening efforts, and the ongoing development in technologies to disrupt insurgents' IED attacks continue to save lives and preserve combat power.

While the sobering losses of our killed and wounded sadden us all, our casualty rate has declined markedly over the last 60 days, due in no small part to those resources you have provided. We partner closely with the sister services to gain synergy in effort and economies of scale. Our close working relationship with our comrades in the Army has been most beneficial.

While the entire Marine Corps is engaged in supporting the global war on terror, we are also preparing for future conflicts. Under the construct of Naval Power 21, Navy and Marine forces of the fu-

ture will further exploit our Nation's premier asymmetric advantage, command of the sea, and be able to leverage immediate full-scale joint operations in support of combatant commanders without relying on host nation support or timely buildup of combat power on foreign soil through seaports and airports that could be denied to us for political or military reasons.

Acknowledging that decisive combat today is fought on land due to our supremacy on sea and in the air, your Navy and Marine Corps are employing the seabase concept to exploit the sea as maneuver room against the enemy ashore. We view seabasing to be the cornerstone of naval transformation and, more importantly, a national capability. Both OEF and OIF have proven that we must be sensitive to our friends' cultural differences and bordering country disputes. Denied access will be the recurring theme in future conflicts. A national capability, seabasing, unreliant on the need for a land-based footprint, one that can loiter over the horizon and project, protect, and sustain integrated joint warfighting capabilities, will give the President immediate response options to protect our Nation's interests and sovereignty, assisting our friends and checkmating enemy designs early.

We need the help of Congress to take steps now in order for us to best prepare the Nation to face tomorrow's irregular threat under any access environments. To fully achieve our capability, we need our ship, surface connector, air connector, strike, and MPF future programs funded to bring this national capability to fruition. We deeply appreciate this hearing.

Without decreasing our flexibility, lethality, or sustainability, we are increasing our Marine Corps agility using the capabilities provided by programs such as lighter weight artillery and new procurement of light armored vehicles. MV–22 and the Expeditionary Fighting Vehicle, you noted in your remarks, Mr. Chairman, allow us to strike faster and deeper. These, combined with the Joint Strike Fighter, Heavy Lift Replacement Helicopter, and the KC–130J, will make us even more capable. The Expeditionary Fighting Vehicle and the MV–22 are our number one ground and air priorities.

We are working initiatives to extend the service life of the CH–53 Echo until the Heavy Lift Replacement can come on line. Our 51 KC–130 requirement has the 17 J models already delivered. These will provide us the aerial refueling capability needed to support our combatant commanders in the plan commitments and take full advantage of our rotary and fixed wing assets. With the Navy's support, we can develop the needed LPD class, LHA(R), LCAC(X), the Joint High Speed Vessel, and DD(X) to develop the seabasing national capability that can provide sovereign options to the President, address any enemy mischief, and conduct operations from tsunami relief to forcible entry.

As we look to the future, we will continue to seek joint solutions. We have strong and continuing dialogue with the Army to share ideas, concepts, technologies, and acquisition efforts in areas such as new combat vehicles, counter-IED capabilities, individual equipment, command and control network solutions, and joint seabasing interoperability. With your continued support, we will ensure that your marines, their equipment, their training, and our organization

are ready for any potential contingency. Marines and their families realize the danger to the Nation, our vital role, and the magnitude of our responsibilities.

As the enemy has learned the hard way, we stand ready today and, with your continued support, we will be ready for tomorrow's challenges.

General Magnus and I are prepared to take your questions.

[The joint prepared statement of General Magnus and General Mattis follows:]

JOINT PREPARED STATEMENT BY LT. GEN. ROBERT MAGNUS, USMC, AND LT. GEN. JAMES N. MATTIS, USMC

Mr. Chairman, Senator Kennedy, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss Seabasing and Resetting the Force. For the committee's specific concern relative to Seabasing, remarks today will focus on those Marine Corps and Navy capabilities that are most urgently needed to realize the potential of Seabasing as a strategic concept and the separate but related needs to reset our heavily committed and hard-used forces.

We are a Nation at war. Our responsibility is both the present and the future and we are obligated to protect our homeland from the physical, economic and psychological threats that were cast upon our Nation's threshold in the opening days of this new century. We must defeat terrorism and other threats to our way of life at their points of origin, rather than react to them at their destinations, the cities and monuments of our homeland. This country must retain the capability to project power and influence to remote places where access may be denied.

For over two centuries your marines have demonstrated that they are the expeditionary force in readiness—Most Ready When the Nation is Least Ready. Scalable, flexible and adaptable for peacetime crises and always innovative for future challenges, your Corps' number one priority is fighting and winning battles. On behalf of all marines, we thank the committee for your continued support and commitment to the readiness of your Marine Corps. Your support has made us more effective in the current fight and will continue to assist us as we reset, reconstitute and modernize our capabilities for operations in uncertain and often chaotic future environments.

CONCEPTS TO CAPABILITIES

While the entire Marine Corps is engaged in supporting the global war on terror, we also have a responsibility to prepare for future conflicts and contingencies. The Defense Department's Strategic Planning Guidance directs balanced capabilities for controlling four principal challenges: Traditional, Irregular, Catastrophic, and Disruptive. Our challenge is to determine the right balance of those capabilities that the Marine Corps must provide to meet challenges across the operational spectrum.

Naval Power 21 is the Department of the Navy's vision that enhances Navy and Marine Corps capabilities today and tomorrow. This vision serves as the way ahead for naval programs and operations. It incorporates the Navy's Sea Power 21 and 21st Century Marine Corps frameworks as a foundation to ensure naval forces control the seas, assure access, and project joint power beyond the sea to influence events and advance American interests across the range of military operations.

America's ability to use international seas and waterways, as both maneuver space and an operating base unconstrained by foreign veto, allows our naval forces to project combat power into the littoral regions, which contain more than half the world's population and more than 75 percent of its major urban areas. Highly mobile and ready for combat, our forward-deployed expeditionary forces are critical instruments of U.S. diplomacy and central components of joint military force packages designed to quickly contain a crisis or defeat an emerging threat.

Reassuring our friends while denying our enemy sanctuary during hostilities, the Navy and Marine Corps Team offers unmatched amphibious forcible-entry capabilities and can provide a persistent combat capability from their mobile sea base, thus reducing the U.S. logistical "footprint" ashore. By exploiting our Nation's premier asymmetric advantage—command of the sea—the Navy and Marine Corps can loiter over the horizon and project, protect, and sustain integrated joint warfighting capabilities, provide additional options for the President, and ensure operational independence for combatant commanders across the full spectrum of warfare.

Seabasing

There are four Naval Capability Pillars that enable Seabasing to be the cornerstone of naval transformation. Seabasing is contingent on sufficient amphibious ships and MPF(F) vessels to form the Sea Base. It relies upon robust Sea Shield capabilities that neutralize current and future threats to the Sea Base and the forces that it supports. It exploits integrated, Navy and Marine Sea Strike capabilities. It depends upon FORCEnet capabilities to tie the various elements together and into the Joint Force. Future Sea Bases will provide a dynamic, mobile, networked platform from which naval and Special Operations Forces can operate at will in relative safety from land based observation and fires. The Sea Base will reduce dependence on vulnerable facilities ashore while reducing footprint.

Expeditionary Maneuver Warfare (EMW) is the Marine Corps capstone concept that serves as a link between today's institutional capabilities and our family of Operating, Functional and Enabling concepts. Those concepts include Operational Maneuver From the Sea (OMFTS), Ship to Objective Maneuver (STOM), and Sustained Operations Ashore (SOA). OMFTS links naval and maneuver warfare, doctrine, and technological advances to rapidly identify and exploit enemy weaknesses across the section of conflict. STOM applies maneuver warfare concepts to the littoral battle space, envisioning seamless maneuver from over the horizon directly to the objectives deep inland. SOA envisions the MAGTF as a general purpose Operation Maneuver Element executing a series of precise, focused combat actions. OMFTS and STOM compel the enemy to defend the complete length of his coastline and array his forces in depth throughout the littoral.

Distributed Operations (DO)

DO is an additive capability to our EMW philosophy and body of concepts stemming from OMFTS. DO, at the strategic and operational level, enables Naval forces to establish a worldwide presence while simultaneously conducting combined and joint training with our allies in selected regions. This global posture allows naval forces to respond rapidly to emerging crises with powerful and sustainable combined arms teams. At the tactical level, the DO can take several forms, based upon the mission, enemy dispositions, and the nature of the terrain. DO is predicated on decentralized command and control. It requires situational awareness, autonomy, and increased freedom of action at lower tactical levels, enabling subordinate commanders to compress decision cycles, seize the initiative, and exploit fleeting opportunities. Improved situational awareness, including real time and high fidelity data from dispersed teams, improves the vertical transmission of information. Shared situational awareness, the product of extensive training as well as a common operating picture, accelerates the horizontal integration and mutually supporting actions of spatially dispersed units.

Based on this richer, higher resolution intelligence picture, and guided by commander's intent, distributed forces could aggregate or remain distributed. They will be able to use simultaneous, overwhelming joint firepower against an increasingly confused and paralyzed adversary, allowing the main force access to the battle space. When pockets of adversaries are found, the distributed units could use swarming attacks to defeat them in detail. By attacking from multiple directions, distributed units will be seemingly everywhere. Using fire and maneuver with the benefits of a networked operational picture and combined arms, commanders will present adversary leaders with a rapidly deteriorating situation. MAGTFs with this additional capability will confront the enemy with more threats, seizing the initiative, and forcing our enemies into a more defensive mindset by limiting his options.

Seabasing, EMW, and DO are the conceptual foundations of the Marine Corps of the 21st century. They lead directly to our required capabilities, modernization efforts, and programs and ensure the Marine Corps continued success in deterring and defeating our Nation's foes.

SEABASING—A NATIONAL CAPABILITY

The war against the Taliban and al Qaeda in Afghanistan provided a harsh dose of reality for those who assumed traditional threats and the availability of friendly, convenient land bases to project airpower and land forces. In the early phases of Operation Enduring Freedom (OEF), two forward-deployed Marine Expeditionary Units formed Task Force 58 and projected the first major U.S. "conventional" combat units into Afghanistan—more than 350 miles from its sea base of amphibious shipping. Yet, their operations were far from traditional or conventional expectations. We believe these recent experiences such as the prohibition of the 4th Infantry Division using Turkey in the early stages of Operation Iraqi Freedom are compelling insights on how operations can be conducted in the future. As anti-access,

military and political measures proliferate; even friendly nations may deny U.S. forces land basing and transit due to their own sovereign interests.

Seabasing represents a complex capability, a system-of-systems able to move at will. Seabasing, enabled by joint integrated and operational concepts, is the employment of ships and vessels with organic strike fires and defensive shields of sensors and weapons, strike and transport aircraft, communications and logistics. We will use the sea as maneuver space to create uncertainty for adversaries and protect the joint force while receiving, staging and integrating scalable forces, at sea, that are capable of a broad range of missions. Its inherent freedom of movement, appropriate scalability, and sustainable persistent power provides full spectrum capabilities, from support of theater engagement strategies, to rapid response to natural or man made disasters, to military combat operations from raids, to swift defeat of enemies, to scale of major combat and decisive operations. The Seabasing concept is illustrated in Figure 1 below.

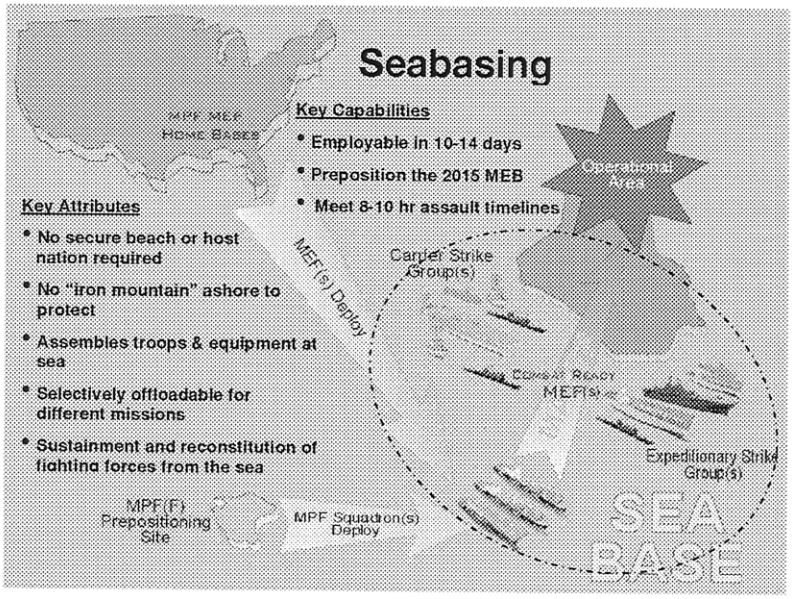


FIGURE 1. SEABASING CONCEPT

Seabasing:

(1) Provides combatant commanders with the positional advantage needed for the National Security and National Military Strategies. It provides the most efficient and effective means to influence or control littoral regions, facilitating rapid deployment and immediate employment, often deep inland. Seabasing provides the combatant commanders a capability that is optimized for use in the very areas of greatest concern and already deployed well forward even before unambiguous indications of crises.

(2) Provides combatant commanders the means, in coordination with the brokers of other elements of national power, to concentrate capabilities at critical times and at decisive locations of our choosing with a degree of surprise.

(3) Gives the combatant commanders the ability to position significant forces and capabilities within the secure environment provided by the protective shields of U.S. Navy and Air Forces in a mobile base that enhances mission security.

(4) Reduces dependence on foreign sovereign ports, airfields, and host nation support. Recent operations in Afghanistan and Iraq highlight the difficulties of denied Key Attributes transit, and the vulnerability of Kuwait's sea and air ports to a variety of threats.

(5) Provides a strategic hedge against sovereignty concerns that can either impede or deny altogether U.S. access to critical regions. The ability to conduct either engagement activities or military and other operations from secure bases in international waters can reassure allies concerned about their domestic reaction to U.S. basing on their sovereign territory.

SEABASING OPERATIONS

Seabasing remains a primary means for the U.S during the global war on terror and for future challenges with often chaotic environments requiring rapid response to peacetime and wartime crises, and follow-on stability operations.

The committee should note that the necessary ships, vessels, watercraft, and aircraft currently programmed in the FYDP, represent the key elements needed to begin implementing Seabasing. Fiscal constraints and priorities will determine how we can implement this transformational change for future challenges as we also continue what may be a long global war on terror.

Today's forcible entry structure is limited to that resident within the 35 amphibious ships of the Battle Force. Today's Maritime Pre-positioning Squadrons have no capability to offload in open sea conditions. Tomorrow's Seabasing force will be an integrated capability linking forward-deployed and surge-able warships with equipment, sustainment and capabilities pre-positioned in Seabasing capable MPF(F) ships capable of selective offload in sea state 3–4, as part of a networked expeditionary strike force.

Today and tomorrow, a most visible element of assurance to allies and deterrence to foes will be naval forward presence, including capabilities of Marine Expeditionary Units (Special Operations Capable) (MEU(SOC)) embarked, protected, and sustained by Expeditionary Strike Group (ESG) ships. These units provide the combatant commanders with forward-deployed units that can conduct a variety of quick reaction, sea-based, crises-response options against traditional challenges or against irregular foes. As Seabasing capable MPF(F) ships are delivered in the future, the amphibious warships Battle Force will serve as the advance force to initiate Joint Rapid or Forcible Entry Operations, building combat power more rapidly and robustly than today's fiscally constrained amphibious Battle Force and today's MPF, which can only disembark prepositioned equipment and stocks on friendly shores.

The Marine Expeditionary Brigade (MEB) is the mid-sized Marine Air Ground Task Force that provides the next level of force from the forward deployed MEU and the Marine Expeditionary Force (MEF), capable of persistent major combat operations. MEBs provide supported combatant commanders with a scalable, war fighting capability for a wide variety of military operations. Today, it is capable of deployment and employment via amphibious shipping (normally 15-amphibious ships, including 5 large-deck amphibious assault ships).

The future Seabasing effort promises more efficiency in generation of MEBs for operational employment as MEBs will be able to flow direct from home bases to the forward, on-scene, Seabasing ships, while leveraging the Sea Shield force protection attributes of the Seabasing capability. As a crisis builds 1–2 forward deployed MEUs serve as the "leading edge" of the MEB, conducting advanced force and limited objective, initial entry/response efforts, while the remainder of the strike power of the MEB is assembled on scene as part of the MPF(F) Seabasing echelon. This will enable MEB-sized Joint Rapid or Forcible Entry Operations in 10–14 days, instead of a month or we can deliver twice as much capability in the same time as required for a MEB today.

The current force-sizing construct requires the capability to respond to 2 swiftly defeat the efforts (SDTE)—each of which could require 15 amphibious ships. One of these crises may become a Decisively defeat Campaign, bringing the most powerful force to bear, the Marine Expeditionary Force (MEF), for highly capable, lethal mobile and sustained operations which today would require 28–30 operational, available amphibious ships. Today's 35 Battle Force amphibious warships can surge the required 28–30 operationally available warships and also provide the peacetime rotation load for ESG/MEU(SOC) presence in up to 3 regions.

We have demonstrated capabilities to surge from MEU-sized forces to MEBs (which can be the MEF forward element) and then to the MEF using additional amphibious ships, adding MPF shipping from other theatres to offload mission required equipment at a secure port. This was most recently done in Operation Iraqi Freedom where the Marine Corps was able to prepare, offload, and assemble 2 MPF Squadrons worth of equipment from 11 ships for employment with marines of the MEF flown in by strategic airlift in less than 16-days. In the future, Seabasing enables us to conduct this operation without being subject to sovereignty challenges,

through exploitation of the two planned MPF(F) squadrons in conjunction with forward deployed amphibious shipping, staging the forces at sea in 10–14 days.

Seabasing Battle Force and Maritime Prepositioning Force Structure

Currently the Department of the Navy has 35 Large Amphibious Ships, and 3 Squadrons of older, Maritime Prepositioning Force (MPF) Ships. Current MPF ships do not have the capability for Seabasing. In the case of the current MPF ships, they are built to commercial survivability standards, manned by civilian mariners, and are not capable of rapid, large scale off-load at sea (due to their dense-pack loading), especially in higher sea state conditions. Current MPF operations normally require a secure port and airfield from which arrival/assembly operations are conducted to "marry" equipment up with strategic airlifted troops.

The 2001 Quadrennial Defense Review (QDR) envisioned an amphibious force structure of 36 warships: 12 large deck aviation ships (LHA/LHD), 12 LPD–17s, and 12 LSD–41/49 class ships. These ships would enable either 3.0 MEU rotational forward presence, or in wartime provide a 2.5 MEB (assault echelon) forcible entry capability (fiscally constrained from a requirement of 3.0 MEB). The 12-ship LPD–17 class was needed to provide the lift capacity for the 2.5 MEB constrained requirement. The current mix and inventory of 35 active Battle Force amphibious ships provides slightly more than a 2.0 MEB lift-forcible entry capability. Recent decisions have reduced the current LPD–17 program to nine ships, putting increased risk/pressure on the need for ensuring the right quantities and quality of warships and MPF ships for future challenges.

ENABLING SEABASING CAPABILITIES

Elements of Seabasing have been under development for some time. Expeditionary warships, MPF(F) ships, high speed surface connectors, vertical air lift connectors, sea-based fires, and ground-based fires are the major enablers to Seabasing as described below.

Seabasing—the Warships

LPD–17

The U.S.S. *San Antonio* (LPD–17) Class of amphibious transport dock ships was designed and planned to replace 61 legacy amphibious assault ships: This fine class of ships is optimized for operational flexibility to meet Marine Air Ground Task Force requirements to project strike (fire and maneuver) forces from the sea deep into littoral land objectives. With its significantly enhanced survivability, habitability, and functionality, it represents a critical element of Seabasing with a spacious well deck for deployment of LCACs and Expeditionary Fighting Vehicles (EFV) and an enhanced flight deck and maintenance facility for employment of MV–22, medium assault tiltrotors and CH–53E/X heavy lift helicopters. Survivability upgrades protect against mines, missiles and surface attack makes it a highly capable platform for the forward deployed ESG/MEU and larger forcible entry operations. With the LHA(R) ship design emphasis on aviation transport and strike fires, the well decks of the LPD–17 and existing LSD–41/49 class have even more importance to the rapid surface movement of Expeditionary Fighting Vehicles deep inland and LCAC transport of heavy or bulky ground equipment and sustainment.

The fiscal year 2006 budget includes $1.3 billion to fully fund the construction of the eighth ship of the class of fighting amphibs. The lead ship of the class the U.S.S. *San Antonio* is approximately 93 percent complete with delivery scheduled for the summer of 2005. In addition to the lead ship, four follow-on ships are under construction. *New Orleans* (LPD–18) was christened on November 20, 2004; *Mesa Verde* (LPD–19) was christened January 25, 2005; construction continues on *Green Bay* (LPD–20) and *New York* (LPD–21). Advanced Procurement contracts for *San Diego* (LPD–22) and *Anchorage* (LPD–23) have been awarded for long-lead time material for these ships. The 8th LPD–17, *Arlington* (LPD–24), is programmed for funding in the fiscal year 2006 budget. The ninth ship, *Somerset* (LPD–25) is planned for fiscal year 2007. The LPD–17 class of warships is critical for the Marine Corps' amphibious lift requirement. LPD–17 ships are used for rapid, early or forcible entry lift in major combat operations and also provides the peacetime rotation basis for up to three ESG/MEU(SOC) regionally forward deployed.

LHD–8

The last of eight LHD class warships capitalizes on the proven design of the LHD 1 class, U.S.S. *Makin Island* (LHD 8) will deliver transformational capabilities when it enters the fleet in 2007. Combining design alterations from LHD 5 onward with new gas turbine propulsion, a revolutionary electric drive, and an enhanced combat systems suite, including Cooperative Engagement Capability (CEC), *Makin Island*

is like no other expeditionary warship in the world. LHD 8 serves as the basis for LHA(R) hull, mechanical, and electrical systems, reducing the technology risk normally found in a new class of ships.

LHA(R)

With $150 million Advanced Procurement funding provided by Congress in fiscal year 2005 and an additional $150 million requested in fiscal year 2006, the first of four LHA(R) ships is programmed in fiscal year 2007. LHA(R), which will replace the aging LHA class ships, is a modified LHD 1 Class design (without well decks) with enhanced aviation capabilities. LHA(R) is designed to accommodate future Marine Corps aircraft, with emphasis on the MV–22, CH–53E/X and the Short Take Off, Vertical Landing (STOVL) JSF Joint Strike Fighter. Distributed Operations conducted from Sea Basing and expeditionary sites ashore, will leverage the increased strike, and support characteristics of these ships with ESGs capable of independent operations, or in conjunction with Carrier Strike groups (CSGs) for large scale operations when land bases are not available for contingencies.

The LHA(R) will have nearly three times the fuel capacity of existing LHDs for sustained operations. It will be capable of operational and maintenance support for either 23 JSF or 28 MV–22 aircraft, or a combination of fixed, rotary wing, and tiltrotor aircraft. MPF(F) capabilities provide the vehicle square and well deck spaces not available in the LHA(R) class as part of the future Seabasing force. The LHA(R) will support Sea Strike operations in addition to supporting fire and maneuver in support of the MAGTF.

Seabasing—Maritime Prepositioning Force (Future) (MPF(F))

MPF(F) will allow us to better exploit the sea to conduct reception, staging integration and projection of forces for joint operations, especially in an access denied environment. MPF (F) will provide four capabilities: (1) at-sea arrival and assembly (2) direct support of the assault echelon of the amphibious task force; (3) long-term, sea-based sustainment; and (4) at-sea reconstitution and redeployment.

The MPF(F) will be a key enabler for Seabasing and future Joint Forcible Entry Operations. During the early phases of a joint campaign, these ships will provide floating bases to enable the rapid reinforcement of forward presence ESG/MEU forces with the rapid scaling up to MEB or MEF-sized forces and follow on elements of the joint force. The MPF(F) and expeditionary warships operating together at sea will provide landing platforms for MAGTFs, Special Operations Forces, and follow-on Army forces.

MPF(F) is part of an integrated Seabasing concept. We will integrate these ships functionally with the forward deployed amphibious warships in the Battle Force to leverage their tremendous capability to reconstitute, re-supply, and rapidly reinforce assault waves launched from the forward deployed, more survivable assault ships. These two distinct, yet linked, components of the Sea Base will enable the joint force to "surge" Marines and follow on joint forces through the Sea Base for more rapid build up of joint capabilities, increasing combat tempo and responsiveness to combatant commanders' needs.

The concept is for at least two squadrons of MPF(F) ships, a total of 14–20 ships. Navy and Army Joint High Speed Vessels will enable rapid movement within the sea base and ashore where conditions permit. The mix of Maritime Prepositioning Force (Future) ships is being determined, and will be capable of surface and air transport of Marine combat units, prepositioning critical equipment, and 20 days of supplies for Marine Expeditionary Brigades. Seabasing will provide increased protection and combat capability as well as rapid deployment and employment of forces compared to our current capabilities.

In addition to $28 million of National Defense Sealift RDT&E funds in the fiscal year 2005 budget, the fiscal year 2006 budget request includes $66 million of RDT&E funds to support technology development such as selective offload in MPF(F). The first MPF(F) ship is planned for fiscal year 2009 with advanced procurement award scheduled in fiscal year 2008.

Seabasing—Surface Connectors

Joint High Speed Vessel (JHSV)

The Joint High Speed Vessel will provide intra-theater, interoperable vessels capable of movements between dispersed operational platforms for inter-modal transfer of troops, combat equipment and sustainment, as well as high-speed dashes to and from shore penetration points and austere ports. Army and Navy intra-theater high-speed vessel programs were recently merged under a Naval Sea Systems Command program office in order to reduce cost yet leverage current commercial tech-

nologies, and ensure interoperability of vessels with the Joint Sea Base by acquisition of U.S. built vessels.

The foreign leased high-speed vessels; Swift and WestPac Express enabled the III Marine Expeditionary Force to expand training and engagement in the western Pacific while decreasing transit time. They were also operationally used in support of tsunami relief operations in the Indian Ocean. The Swift also provides a research and development test bed and is able to serve in support of contingency response requirements.

Contract awards for the first Army-funded JHSV is expected in fiscal year 2008 with delivery in 2010. The first Navy-funded JHSV is programmed for fiscal year 2009. With currently three JHSVs in Navy plans, the Department continues joint exercises, experiments, and warfighting assessments to refine its requirements.

Landing Craft Air Cushion (LCAC) Service Life Extension Program (SLEP)

LCACs were the first high-speed surface connector for expeditionary forces. Capable of high-speed dashes up to 50 nautical miles from shore, they carry heavy equipment, and can access a wider array of littoral beaches than previous displacement landing craft.

The LCAC SLEP program provides improvements in the navigation, communication, and hulls for the aging fleet of LCACs, while also providing them a Sea State 3 heavy lift capability, which is required performance for both MPF(F) and amphibious ships operating in the Seabasing environment.

LCACs will remain a critical component of surface lift for the Marine Corps. Upgrades provided by the LCAC SLEP will ensure its continued relevance, readiness of our expeditionary forces, and interoperable capabilities within and from the Joint Sea Base. The LCAC (SLEP) fleet will begin to reach the end of its service life in 2014. The follow-on, LCAC(X) program will carry significantly larger loads, payload weight, have extended ranges, and reduce the number of trips required for the force to and from the shore from Seabasing ships.

The Department has requested $14 million in R&D funding for the LCAC(X) program in fiscal year 2006, and programmed to start procurement in fiscal year 2010. The Department has programmed $111 million for the LCAC SLEP program for six LCACs in the fiscal year 2006 budget.

Expeditionary Fighting Vehicle (EFV)

The EFV is the Marine Corps' highest ground combat acquisition priority, with low rate initial production scheduled to begin in fiscal year 2007. With Initial Operational Capability in fiscal year 2010, the EFV will replace our Assault Amphibious Vehicle (AAV)—7, which is undergoing a rebuild program to prevent gaps in capability. EFVs will carry the surface assault echelon's of forcible entry forces, at seaspeeds four times that of the AAV–7, as part of multi-dimensional attacks through littoral penetration points to join deep inland with forces vertically lifted by MV–22 and CH–53E/X aircraft. On reaching the shore from their over-the-horizon launch point, EFV will have the speed to maneuver with the M1A1 tanks and Light Armored Vehivles (LAVs) and the sustainment to continue the assault deep inland for link up with vertical assault forces, or independent maneuver. They will provide marines a modern armored nuclear/biological/chemical (NBC)-protected combat vehicle with a truly impressive 30 mm cannon to provide close support to dismounted troops and accurate fire on the move capability.

The EFV gives marine forces a unique ability to use the seas, rivers, swamps and marshlands for operational and tactical maneuver, a capability recently demonstrated by the aging AAV7A–1 family in OIF when maneuver forces crossed Iraqi rivers when bridgeheads were choked or not existent.

Seabasing—Vertical Lift Aircraft Connectors.

The medium lift MV–22 program is the centerpiece of aviation lift connectors for the Seabasing force. The MV–22 is designed to replace the aging CH–46E and CH–53D helicopters. Optimized for speed, endurance, and survivability to rapidly deploy forces from bases deep at sea to objectives deep inland. The MV–22 will carry 24 combat loaded marines, can externally lift the Lightweight 155mm Howitzer, and will internally lift the Expeditionary Fire Support System (EFSS) 120 mm mortar, and the Internally Transportable Vehicle (ITV).

The fiscal year 2006 budget request includes $1.3 billion for nine MV–22s, trainer modifications and retrofits; $206.4 million is also included for continued development, testing, and evaluation.

The CH–53E/X Heavy Lift Replacement (HLR) program will replace our aging fleet of CH–53E Super Stallion helicopters for the Marine Corps' vertical heavy lift requirement. CH–53E helicopters have already begun retirements due to reaching service life margins, with large block retirements expected after fiscal year 2012.

The CH–53X/HLR is a derivative design of the existing CH–53E, remaining within the same shipboard footprint, providing greater lift, reliability, survivability, maintainability, and cost of ownership improvements over the legacy CH–53E. It will have shipboard compatibility with all current and planned amphibious ships, as well as MPF(F), and be able to remain at sea as part of the Seabasing force for extended periods. The CH–53E and CH–53X/HLR will be critical to operations in anti-access, area-denial environments, enabling force application and focused logistics from far offshore to deep inland sites. The HLR will transport 27,000 pounds to distances of 110 nautical miles with combat payloads to include the LAV or two-armored High Mobility Multi Wheeled Vehicles (HMMWV). To sustain the force, the HLR will be the critical logistics air connector for sea-based power projection operations.

The fiscal year 2006 budget requests $272 million in RDT&E funds for the System Development and Demonstration phase of the CH–53X/HLR program.

Seabasing—Fires

The complementary capabilities of surface- and air-delivered fires continue to be highlighted in ongoing combat operations in Operation Enduring Freedom and Operation Iraqi Freedom. Precision and volume fires are critical to the lethality and survivability of Marine, Army, and Special Operations Forces. Capitalizing on lessons learned, and the imperative of modernization necessary for select legacy systems, the Corps is improving our short and long-range organic fires and our target acquisition sensor platforms in support of Expeditionary Maneuver Warfare, and especially for Distributed Operations forces.

Vertical Unmanned Aerial Vehicles (VUAV)

VUAV performance must achieve the speed, range, payload, survivability, and reliability, interoperability with command and control, as well as shipboard compatibility with Joint Rapid or Forcible Entry Operations as well as existing and future Seabasing ships. We have begun evaluating the Coast Guard's Eagle Eye UAV, which is a high-speed tiltrotor craft developed as part of its Deepwater Program. The VUAV is expected to provide a long-range sensor platform able to conduct both focused and wide ISR with time-critical targeting information for Seabased fires as well as maneuver fires deep inland.

The Marine Corps requires a replacement of its almost 20-year-old Pioneer UAV system, which had flown over 6,950 hours in support of OIF. Tactical UAVs are clearly critical for marine and other forces. The fiscal year 2006 budget requests $9.2 million to evaluate the Eagle Eye program.

STOVL–JSF and Strike Aircraft Upgrades

The F–35 Joint Strike Fighter, Short Take Off Vertical Landing (JSF STOVL) aircraft will enhance our ability to conduct precision strikes and provide close support to our marines on the ground. JSF combines the basing flexibility of the AV–8B with the multi-role capabilities, speed, and maneuverability of the F/A–18 for both the air-to-ground and air-to-air requirements of the MAGTF. The aircraft has a very low radar cross-section and provide superior capabilities over our legacy aircraft in areas of survivability, lethality, and supportability. The STOVL version of JSF is being developed specifically for the marines and seven Allied partners. Use of the STOVL variant doubles the available Seabasing platforms for basing of strike aircraft, enabling dispersal of our critical strike aircraft across multiple platforms for survivability.

The JSF program is due to undergo a critical design review in November of this year, and if approved for Low Rate Initial Production, IOC is planned to occur in 2012. As the Marine Corps chose to leap over the evolutionary improvements of the F–18E/F programs for its aging F–18A/C/D and AV–8B inventory, it is critical to the MAGTF's combined arms and Seabasing future to begin fielding the STOVL JSF within the FYDP. The fiscal year 2006 budget request contains $2.4 billion for continuation of System Development and Demonstration on the JSF.

DD(X) Land Attack Destroyer

Designed to operate as part of Expeditionary Strike Groups, the DD(X) will provide long range, time-critical, all-weather, precise, and high volume fires to the Seabasing force and follow on joint forces. Its improved stealth enhances its survivability. The DD(X)s 155 millimeter Advanced Gun System (2 per ship) will provide increased rate of fire, range and lethality over currently available naval guns through its associated Long Range Land Attack Projectile (LRLAP). DD(X) will provide precision and high volume fires at ranges up to 100 nautical miles in support of Seabasing inserted forces. In addition to the long-range cannon, DD(X) can employ Tomahawk Land Attack Missiles from the ship's 60 tubes of the Peripheral

Vertical Launch Systems. The DD(X) will be able to conduct multiple round, simultaneous impact missions, when combined with its larger shell casing will yield significantly improved lethality for soft and hard targets. It will be integrated into the Joint command and control network, through the Naval Fire Control System at sea, and Advanced Field Artillery Tactical Data System (fielded with Marines and Army forces) ashore.

Each ship will be designed to carry 600 long-range 155 mm munitions plus 70 long-range land attack projectiles to provide high volume support. Planned logistics systems to support the DD(X) in legacy and future Combat Logistic Force ships of the Seabasing Force will have unique packaging and handling mechanisms to enable rapid re-supply missions for the DD(X) to quickly reconstitute its magazines, allowing the ship to remain engaged in the fight. A range of 8 to 12 DD(X) ships would support forcible entry operations.

The fiscal year 2006 budget request includes $1.1 billion in RDT&E for continued technology development and $716 million in SCN advance procurement funds for the first and second DD(X). The FYDP includes full funding for the first DD(X) in fiscal year 2007 and construction of one ship per year in each follow on year.

Organic Ground Combat Fires

The M777A1 Joint Lightweight Howitzer (LW–155) will be the primary indirect fire artillery weapon of the Marine Corps. A joint program, it leverages commonality of ammunition with the majority of the war Reserve stockpile, combined with an extensive family of precision and lethal munitions, capable of firing both close and deep fires in support of maneuver. Reductions in weight through use of advanced materials make it transportable from the Seabasing force by all medium and heavy lift aircraft.

The Expeditionary Fire Support System (EFSS) will provide the vertical assault element of MAGTFs with immediately responsive, lethal, organic indirect fires at ranges beyond current infantry battalion mortars. The lighter weight, rapid fire, and small profile rifled mortar, will increase the ability of sea based forces to load more capabilities than the present truck-intensive artillery batteries. The Marine Corps is procuring ITV along with the EFSS to give it ground mobility. The EFSS and the ITV will be internally transportable by the CH–53E, MV–22, and CH–53X/HLR, and leverage their high speeds in support of deep or distributed operations forces.

The Joint High Mobility Artillery Rocket System (HIMARS) will fulfill a critical gap in organic Marine Corps ground based fire support, providing 24-hour, all weather, precision and high volume missile fires. HIMARS is air transportable by C–130 aircraft, and will fit on JHSVs and LCACs from Seabasing ships. It provides a highly responsive, precision ground-based means to engage time critical, sensitive targets, complementing aviation fires. As part of the balanced suite of organic ground combat, naval surface, and air-delivered fires, HIMARS augments the lightweight artillery capabilities, providing the Division and MEF commanders the ability for both precision and mass fires at depth throughout the battlefield. One active and one Reserve Battalion of HIMARS is being procured, beginning in 2006.

Complementary Low Altitude Weapon System (CLAWS)

CLAWS is a surface-to-air weapon systems utilizing HMMWV-mounted AMRAAM missiles. It will possess the mobility and lethality required to keep pace with supported maneuver elements, and will fill the gap in naval air defenses during extended littoral operations. Initial fielding is expected in fiscal year 2009 with FOC expected in fiscal year 2015.

Training Ranges—The Seabasing concept, will require realistic training opportunities to ensure that marines are fully prepared to operate in and from the maritime environment. Our littoral training bases, Camp Pendleton, California and Camp Lejeune, North Carolina are absolutely critical in preparing our forward deployed ESGs/MEUs and exercising the Seabasing capability. Our ability to conduct the fullrange of air-ground task force missions at these bases has been seriously eroded by a variety of encroachment issues over the years. It is imperative that we protect our current capabilities at both locations while doing our best to recapture some of their former capacities. We must also continue to invest in our major MAGTF training ranges at Twentynine Palms, California and Yuma, Arizona. These locations, though located some distance from the sea, permit us to more closely exercise the full capability of the air-ground task force in coordinated, live-fire exercises. Just as the Seabasing concept lends itself to employment throughout the world, our need to retain access to the valuable training ranges owned and operated by our sister services and our allies is of primary importance to the readiness of maritime forces.

The unprecedented level of cross-service utilization of the portfolio of ranges optimizes the interoperability of joint and coalition forces.

THE MARINE AIR GROUND TASK FORCE

The Individual Marine

Today's marines, defending our way of life today on the battlefields of Iraq and Afghanistan, personify our ethos that—every marine is a rifleman. The success of the Corps is today, as it always has been, built upon Marines and their warrior ethos. We create warriors who are both expeditionary and interoperable in the joint, coalition, and interagency arenas as part of a Seabasing force or for expeditionary operations deep inland, capable of creating stability anywhere around the globe.

From our advertising, recruiting, training, and education programs, we develop our marines' ability to think independently and act aggressively as a matter of routine. We create marines that thrive in the chaotic and unpredictable situations and environments that characterize the battlefields of the future. Our combat capability is built around riflemen, who in turn form scalable, combined arms teams.

We will increase the speed, flexibility, and agility of our MAGTFs by first renewing emphasis on our greatest asset, the individual marine, through improved education and training in foreign languages, cultural awareness, tactical intelligence and urban operations. We are equipping them to operate in the alleys of the urbanized littoral, areas they already dominate in places so recently in the headlines like Fallujah, Ramadi, and the northern Babil Province. Our 21st century marine will "out-learn, out-think, and out-fight" any adversary and embody an aggressive moral spirit, a refined level of adaptability and mental agility, and the flexibility necessary to confidently and successfully operate on the future battlefield. Second, we are focused on implementing Distributed Operations where we will dominate terrain with small dispersed units when appropriate, and take hold of terrain by concentrating as the situation dictates.

In keeping with our principle of equipping the marine for the fight, we have accelerated efforts to purchase the Modular Weapon System to replace our M16A2 rifles; to increase the density of Advanced Combat Optic Gun sights, Sniper Scopes and Thermal Weapon Sights that will enable our Marines to engage at extended ranges with precision, and to increase their operational tempo and agility, day or night. We are accelerating efforts for procurement of Common Laser Rangefinders to export targeting data to advanced GPS location devices, and hand them off to our Seabasing Fires enablers via the Target Hand-Off System for Distributed Operations capable squads and traditional fire support teams. We are making major improvements in small-unit, and MAGTF intelligence support equipment to synthesize and disseminate information from across the spectrum. At the same time we have made great strides through your support in providing individual and vehicle protective armor. One of our most significant investments is in radio systems to enable inter and intra squad communications, as well as over-the-horizon communications, Joint Tactical Radio Systems, and Satellite Communication on the Move capability.

In the coming months, we will stand up a Center for Advanced Operational Culture Learning (CAOCL) which will ensure that Marines are equipped with the requisite regional, cultural, and language knowledge to allow them to operate successfully in the Joint expeditionary environment . . . in any region of the world . . . against the range of irregular, traditional, catastrophic, and disruptive threats.

End Strength

The Marine Corps greatly appreciates your recognition of our manpower needs after we had extensively reviewed and restructured some existing capabilities to meet urgent needs, and through use of our recent temporary manning strength increase to a force level of 178,000 Active-Duty marines. Our first priority is to increase our infantry units' manning levels and mitigate the stress on these heavily committed organizations, which have seen upwards of a 1:1 rotation ratio in the past year due to the demands of global war on terrorism. We will also create dedicated Foreign Military Training Units (FMTUs), add to our recruiting force, and provide more support personnel for the operating forces in order to enhance our training and support to our marines and their families.

USMC/U.S. Special Operations Command Initiatives

Ongoing operations in support of the global war on terror highlight the interdependence in the battle space between Marine Corps operating forces and Special Operation Forces. The Marine Corps' pursuit of increased irregular warfare capabilities has resulted in formation of Foreign Military Training Units to assist USSOCOM. Examples of some of our recent successes include the Republic of Georgia Train and Equip Program; providing training capability to the Afghan National

Army, and Military Assistance Training Teams to the Iraqi National Army. The commandant and commander of SOCOM are committed to exploring new ways to leverage each others capabilities as we continue to fight irregular wars, to include use of the Joint Seabasing concept for future deployment and employment options. Equipment compatibility is a crucial ingredient in this relationship and we continue to pursue the means to train, work, and operate more fluidly in the special operations environment.

Marine Corps Force Structure Review Group (FSRG) Initiative

Prior to enactment of the National Defense Authorization Act (NDAA) for Fiscal Year 2005, we commenced a comprehensive total force structure review to better meet the demands of the 21st century and long-term global war on terror. Subsequently, we began implementing force structure realignment initiatives intended to enhance low density/high demand capabilities, and to reduce stress for critical units as part of global war on terrorism. Since 1991 the Marine Corps has conducted multiple "lean-down, reorganize" initiatives to better prepare for tomorrow's fight. As before, the FSRG initiatives are end strength and structure neutral, requiring additional equipment, facilities, operations and maintenance resources to implement. Structure changes include the establishment of two additional infantry battalions, three light armored reconnaissance companies, three reconnaissance companies, two force reconnaissance platoons, and an additional Air-Naval Gunfire Liaison Company (ANGLICO) for the active component. Existing explosive ordnance disposal, intelligence, aviation support, civil affairs, and command and control assets will receive additional augmentation. The Reserve component's structure initiatives will increase the capability of Marine Forces Reserve to respond to the global war on terror and includes the establishment of an intelligence support battalion, a security/anti-terrorism battalion, and two additional light armored reconnaissance companies. Civil affairs and command and control units will receive additional augmentation and some Reserve units will be converted into Individual Mobilization Augmentee (IMA) Detachments—allowing more timely access to these Marine reservists to support contingency operations—in order to improve the effectiveness of their contributions.

We continue to pursue sensible military to civilian conversions in order to increase the number of marines in the operating force. The temporary end strength increase, implementation of force structure initiatives, and military to civilian conversions are expected to help mitigate any potential negative effects this high tempo may have on individual marines and our force's readiness.

The majority of new units created by these initiatives will achieve IOC in fiscal year 2006, with Full Operating Capability (FOC) by fiscal year 2008. MILCON and equipment procurement requirements will require funding in Fiscal Year 2005 to support IOC and FOC because military construction projects have an average lead time of 2 to 3 years, and many of the procurement items have lead times ranging from 18–24 months.

Our estimate of force structure initiatives' costs from fiscal years 2005–2011 totals approximately $1.4 billion, of which $408 million is included in the fiscal year 2005 supplemental request. The fiscal year 2007 and out year costs required to complete and sustain the FSRG recommendations are being addressed for inclusion in our baseline budget.

SUSTAINING COMBAT OPERATIONS AND RESETTING THE FORCE

Sustaining the Current Level of Effort

Your support has ensured our near-term readiness remains strong, even while current demand on the force is high. In the past two years, we have gone from a pre-global war on terrorism deployment rotation ratio of just over one-to-two (~6 months deployed/~14 months home) to our current ratio of just above one-to-one (~7 months deployed/~7 months home), primarily in our infantry battalions, rotary-wing aviation squadrons, and other high demand units. This means that many Marine units in the operating forces are either deployed or are training to relieve deployed units. Most notable amongst these factors is the consistent, sustained deployment of approximately 30 percent of our ground assets and 25 percent of our aviation assets in support of the global war on terrorism. Those deployment rates, when considered in the context of our assumption that most of the ground equipment in theater eventually will be attrited or beyond economical repair, highlight the potential enormity of our equipment replacement requirements. Ground and aviation assets will either be replaced through normal, albeit accelerated, procurement methods or short-term measures will be taken to mitigate loss of capabilities until anticipated modern or transformational capabilities enter the force.

The incremental operational costs of both OIF and OEF have been principally funded through supplemental appropriations based on Office of the Secretary of Defense guidance. In addition to the supplemental funding requests, the Marine Corps has reprogrammed $400 million, through either existing below threshold authority or by above threshold requests to Congress, for essential warfighting equipment in response to deployed Marines requests via our Urgent Universal Needs Statement (UUNS) process. The Marine Corps included some resetting the force requirements: $71 million for depot maintenance and $139 million in procurement of equipment and ammunition in the fiscal year 2004 supplemental. That was an initial estimate of a total bill that is still being accumulated.

In the spring of 2004, the Secretary of Defense requested that the Services assess the impact of higher operating tempo and environmental factors on the total inventory of equipment employed in Iraq and Afghanistan. The Marine Corps conducted a Demand on Equipment analysis on an initial list of 94 high cost/high use items of equipment, including both ground and aviation systems. That analysis estimeted $2.2 billion in replacement/repair costs, which were included in the fiscal year 2005 supplemental request. Additionally, the Marine Corps requested, through the fiscal year 2005 supplemental, funding to replace equipment taken from our prepositioning stocks (Maritime Prepositioning Squadron and Marine Corps Prepositioning Program—Norway stocks) ($246 million), and CONUS stocks ($400 million), and to fund urgent warfighting equipment needs in the field ($2.1 billion). In all instances, we assessed our ability to contract for and obligate fiscal year 2005 funding to expedite the delivery of this equipment. However, due to industrial base and other execution issues, a portion of our requirements must be deferred until fiscal year 2006 and subsequent fiscal years. At present, the Marine Corps is using the funding provided by the fiscal year 2005 Bridge Supplemental ($2.1 billion) to finance global war on terrorism operations and to procure urgently needed force protection equipment, including additional vehicle armor kits and aircraft survivability equipment.

Equipment Cross-leveling

A critical aspect of the Marine Corps reconstitution/reset the force planning effort is our ongoing effort to cross-level equipment across the total force, to include equipment required in Iraq and Afghanistan, pre-positioned stocks, and home station operating/training sets. In order to ensure seamless operational support to OIF and the most cost effective strategy for force rotations, the commandant directed that equipment necessary to prosecute OIF operations remain in theater for as long as practical. This policy has allowed the Marine Corps to focus our efforts on identifying, attaining, and delivering the best equipment possible to forces in theater. This policy also drastically reduces equipment rotation costs, thus husbanding critical financial resources for other uses.

Although having the best equipment, in the right quantities, in support of deployed units is paramount, the policy of retaining equipment in theater has led to home station equipment shortfalls. In order to fill these shortfalls to a level that will enable satisfactory pre-deployment training, we have initiated actions to cross level equipment throughout the Marine Corps, including both active and Reserve components.

Rapid Acquisition Processes

The Urgent Universal Needs Statement (UUNS) process, which we initiated in 2002, is critical to ensuring our marines are as well equipped as possible. As a truly bottom up process, it provides a way for our warfighters in the Operating Forces to identify and forward new requirements for weapons and gear for quick review and approval (usually in less than 90 days). Through the leadership of the Secretary of the Navy, and supported by the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RDA), the Navy-Marine Corps team worked an expedited process known as "Operation Respond" for expedited review and acquisition of Marine and Navy requirements, leveraging the Department's R&D and laboratory efforts to employ cutting edge technology where appropriate. We are also participating in the Deputy Secretary of Defense-led Joint Rapid Acquisition process, which recently approved acquisition of 122 Cougar EOD vehicles for deployed Marine Corps and Army EOD teams. Our UUNS process has enabled us to aggressively pursue the addition of armor to all of our HMMWV and MTVR trucks used outside of garrisons within the USCENTCOM Area of Responsibility, and to quickly provide adequate body armor, improved rifle optics, counter Improvised Explosive Device equipment, night vision devices, Blue Force Tracker equipment, personal role radios (squad level communication devices), unique ammunition items, and numerous other warfighting and force protection critical items. Throughout all these proc-

esses, the Services have cooperated closely to ensure we leverage the best ideas and efforts in order to equip our warriors on the ground and in the air.

Demand on Equipment

The global war on terror usage rates in combat theaters are up to eight times higher than those in other locations. This increases the cost of operations and maintenance beyond what is typically budgeted. During each month of OIF, the Marine Corps incurred equipment maintenance and sustainment related costs of close to $80 million a month beyond normal budgeted levels that had to migrate from other sources. Assuming a similar operational tempo, and making adjustments for the current equipment density that is deployed in theater, the Marine Corps can expect in excess of $50 million per month of ground equipment maintenance requirements over baseline program, non-combat maintenance needs. In addition to higher usage rates, equipment is being used under extreme conditions, increasing maintenance requirements. Further, the practice of adding armor to unarmored vehicles creates significant stress on vehicle frames and power trains, and although lives have been saved and injuries prevented, it comes with detrimental costs to the materiel. To date, more than 1,800 principal end items valued at $94.3 million have been destroyed. An additional 2,300 damaged end items will require depot maintenance. The stress on equipment continues.

Our legacy aircraft are performing their assigned missions and holding up well under highly increased usage rates. The venerable CH–46 troop transport helicopter has been flown in support of OIF at 230 percent of its peacetime usage rate. While utilization rates have increased, the overall trends for deployed aircraft readiness have remained fairly constant, averaging 72 percent. In order to improve our readiness rate in theater, we are creating a limited aircraft depot maintenance capability. As a result of supporting combat operations, our non-deployed units are experiencing lower readiness, currently at 69 percent and trending down, while the utilization has remained constant.

Hellfire missiles continue to be expended in support of current global war on terrorism operations. The fiscal year 2005 supplemental requested an additional $43 million to reconstitute our Hellfire inventories. This request is more urgent due to termination of the previously planned Hellfire replacement, the Joint Common Missile program. In addition to Hellfire needs, engineering teams have tested 1036 LAU–7 launchers for our F/A–18s and found 12.5 percent cracked (as of December 19, 2004), and 53.2 percent worn beyond limits. The current failure rate would result in non-mission capable F/A–18 aircraft in 2006. Support for the Marine Corps' fiscal year 2005 supplemental funding request of $11 million for LAU–7s will provide long lead items, ensure deliveries in 2006 to maintain F/A–18 aircraft readiness.

Marine Aviation Command and Control Systems, specifically our legacy TPS–63 and TPS–59 (version 3) radar systems, have experienced heavy utilization and resultant degraded readiness due to the global war on terrorism. There are no open production lines. Acceleration of the G/ATOR and HELRASR modern replacement programs is a part of our mid-term reset requirements.

Prepositioning Programs Reset Actions, Requirements, and Funding

OIF provided an opportunity to employ Maritime Prepositioning as it was envisioned. The offloading of 11 ships in 16 days through one port was the second largest MPF operation in history, providing most of the equipment used by marines in OIF I. The equipment readiness on the first squadron was 98.5 percent, while the second squadron was 99.1 percent. After OIF I, and concurrent with the reorganization to "mirror image" our squadrons, we began reconstituting downloaded ships even as we continued to support ongoing operations. Equipment and supplies not used to reconstitute MPSs in Kuwait and not required by engaged forces were brought to Blount Island Command (BIC) and put in general support of MPF Maintenance Cycle 8 (MMC–8), which commenced with the reconstitution of MPSRON–1 beginning in April 2004.

MPSRON–1 completed reconstitution and its maintenance cycle in March 2005 and is ready to support the operational requirements of the regional combatant commanders. The squadron's major end item maintenance readiness is 99.6 percent. In March-April 2004, two ships from MPSRON–2 and maritime prepositioning equipment and supplies from Blount Island Command were used to support marines still conducting operations in Iraq. All of MPSRON–2's maritime prepositioning equipment and supplies have been downloaded. Four of its ships are in the Common-User Sealift Pool (CUSP), and one is conducting Extended Maritime Interdiction Operations (EMIO) in direct support of Commander, U.S. Pacific Command. Ships from MPSRON–2 will rotate through its maintenance cycle from June 2005–April 2006.

MPSRON–3 was reconstituted in Kuwait from September 2003–February 2004 and will rotate through its maintenance cycle from March 2006–April 2007. The squadron's current major end item maintenance readiness is 98.8 percent .

Marine Corps Prepositioning Program-Norway (MCPP–N)

The Marine Corps is in the process of transforming its Norway Air-Landed Marine Expeditionary Brigade (NALMEB) prepositioning program into the MCPP–N. The prepositioning objective for MCPP–N is projected to be roughly equivalent to the NALMEB prepositioning objective, while its mission is transforming from a Cold War paradigm to an emphasis on forward deploying war reserve material pre-positioned stocks in general support of all regional combatant commanders.

After OIF I, MCPP–N transferred major end items to the MPF program in support of the back load of prepositioning ships during MMC–8. In support of OIF II, the Marine Corps deployed approximately 5 percent of MCPP–N's major end items. On 1 March 2005, the Marine Corps redistributed 25.6 percent of MCPP–N's readiness-reportable major end items to units preparing to deploy in support of the global war on terrorism as part of our equipment cross-leveling plan. The program's current major end item maintenance readiness is 99.8 percent, and it is currently at 80.1 percent of its overall major end item's prepositioning objective. Its on-hand readiness for reportable end items will decrease to 38.2 percent when ongoing redistributions are complete.

The Marine Corps is planning the reconstitution of MPSRON–2 and MCPP–N. The only capability that will prove difficult to reconstitute in the short term is ground equipment. The foundation of our reconstitution efforts is the additional Procurement Marine Corps (PMC) funding from the fiscal year 2005 supplemental. Our fiscal year 2005 supplemental request contained PMC funding to procure the majority of those MPSRON–2 and MCPP–N major end item shortfalls that are executable in fiscal year 2005. When approved, and upon completion of fielding, the projected attainment for major end items will be 75 percent for MPSRON–2 and 87.5 percent for MCPP–N. The Marine Corps currently projects we will require additional PMC and O&MMC dollars to complete the reconstitution of MPSRON–2 and MCPP–N in fiscal year 2006 and future years.

Reset the force

Fighting the war, and resetting the force for the future, is the commandant's focus. While it depends on the individual item of equipment selected, in general, our ground equipment is experiencing roughly eight times the use normally experienced during peacetime operations. The decision to replace, rather than repair, major equipment items is, in most cases, cost-effective due to transportation costs to and from the central command's area of responsibility, accelerated aging due to high operational tempo, environmental degradation, and the need to keep up-armored vehicles in theater to support future rotations. Completely resetting the force will require additional investment over several years to accomplish. The cost today to reset the ground and aviation global war on terrorism force is estimated to be $4.0 billion and $1.3 billion respectively.

CONCLUSION

Today, we are at war the likes of which we have never fought before. It is literally for our future, for our way of life. Our enemy is ruthless and knows no rules, no laws, and no bounds. He fights to kill Americans and those Iraqis who have stepped forward and are standing firm to prevent another murderous regime—this one based on extremism in its most brutal form—from replacing Hussein and his henchmen. Your marines standing shoulder-to-shoulder with other young Americans of our military services, and the Iraqi security forces, are performing extremely well due directly to the support they have received from Congress. As we sit here today in this great hall protected by these young Americans, they are fighting an enemy that shows no quarter, but the ideals of American decency and honor, their extraordinary courage, dedication, and commitment armor them in a way that nothing else can. Marines and their families realize the danger to the Nation, their vital role, and the magnitude of their responsibilities. Many have been wounded or killed in action over the past year carrying out these responsibilities. In the national debate over the root causes of war some of us may doubt the wisdom of our actions in this troubled land, but they do not as many of you who have traveled there have discovered. We owe these marines and our sailors, soldiers, and airmen an irredeemable debt.

Marines continue to demonstrate that we are an expeditionary force in readiness—Most Ready When the Nation is Least Ready. Our number one priority is fighting the war and resetting the force for the future. Your sustained commitment

to improving our Nation's Armed Forces to meet the challenges of today, as well as those of the future, is vital to the security of our Nation. We recognize Seabasing as being more than tactical level operations, but rather a National Capability that regional combatant commanders can immediately apply to emerging threats transcending all levels of warfare. No longer will we need to rely on critical airfields and seaports in the initial phases of conflict.

On behalf of all marines, we thank the committee for your continued support that has made us more effective in the fight, saved lives, and will allow us to protect the Nation in an uncertain future.

Senator TALENT. I am here for the duration and I know that often committee members come with a question or two in mind. So I am going to go right to Senator Kennedy and then to the other members.

STATEMENT OF SENATOR EDWARD M. KENNEDY

Senator KENNEDY. Thank you very much, Mr. Chairman. I would like to put my full statement in the record and join with the others.

[The prepared statement of Senator Kennedy follows:]

PREPARED STATEMENT BY SENATOR EDWARD M. KENNEDY

Thank you, Mr. Chairman, for calling this hearing today. I want to join you in welcoming these witnesses to the subcommittee this afternoon. We meet to discuss Marine Corps development and procurement priorities and the concept of Seabasing.

First, I want to express our deep appreciation for the service and sacrifices that the men and women of our Armed Forces are making in war in Iraq today. There may have been spirited debate about the circumstances leading up to the war, but no one should doubt our Nation's solidarity behind our armed forces once they are committed to battle.

However, we must not let outstanding performance by the Navy and Marine Corps distract our attention from some very real problems that face the sea services. This subcommittee has been working diligently with the Department of the Navy to address some of these very important problems, including:

- improving fire support capability, including organic Marine Corps fire support and Navy shore fire support; and
- augmenting our strategic lift capability.

The focus of our hearing will be on the vision for Marine Corps' operational concepts for the future and how the budget before Congress supports that vision with development and procurement programs. I continue to believe that the fundamental problem that we must deal with in this subcommittee is achieving the proper level of modernization to support tomorrow's readiness.

Without sufficient modernization aimed at the proper objectives, we could be faced with a situation of having forces without necessary capabilities, or we could be in a position of trying to support theater combatant commanders' requirements with forces that are too small to meet their requirements. We all know that our men and women in the armed forces will respond admirably in any crisis, just as they have been doing to support the operations in Afghanistan and in Iraq.

However, over the long-term, we cannot count on making up for inadequate investment by asking our forces to do more with less.

Everyone can agree that we will continue to need strong Marine Corps forces to protect our interests in many areas overseas. Within that context, there are a number of investment issues we need to consider today.

Again, Mr. Chairman, thank you for holding this hearing today.

Thank you. I thank those that are under you, the men and women that are serving so nobly and gallantly in dangerous circumstances all over the world. We very much appreciate their service to our country.

I would like to focus initially, General Magnus, on our up-armoring of our High Mobility Multi Wheeled Vehicles (HMMWVs) and where we are on this with regards to the marines. This has been an issue which we have been interested in this committee for some period of time. I have here—we have all got short periods of time—

since September 2003 to April 2005, nine different estimates about what was going to be necessary in terms of meeting our military obligations in both Iraq and Afghanistan, and the marines have been included in most of these estimates. They have been pointed out and I am not going to take the time to do it.

Then the variance in terms of productions and how that has altered and varied and changed over the period of the last years. We have probably 35 young men that have lost their lives from Massachusetts. The best estimate is probably a third of them have died either because of lack of the up-armoring of the HMMWVs, some the electronic triggering of the devices. I have visited with all of the parents of all of the ones that have been killed or their family members in Massachusetts, and this is a continuing and ongoing issue and battle.

I would be interested in what your status is at the present time. We have the supplemental. Actually, even while we are here trying to negotiate some increase—we have an increase in this in the House over what was in the Senate by about $250 million. I think that is over what the administration actually asked for, and Senator Bayh has been enormously interested in this as well.

Could we—I have a limited period of time. I would like to know sort of where you are on this, what your own kind of take is when all your troops are going to feel adequately protected. We have the up-armoring and then we have the support in terms of the trucks, and then maybe some information maybe turning to the electronic devices and whether we have a shortage or not. We have had testimony before the full committee that there is a shortage in terms of that, and I know there is important sort of research both within the military to try and sort of upgrade technology in that area.

What can you tell us about this?

General MAGNUS. Senator Kennedy, thank you very much for the opportunity, Mr. Chairman, the rest of the committee, an on-point question as to where we are in conducting this war right now. As the Senator indicated, there were a variety of estimates that came from the Department starting in late 2003. In late 2003, the First Marine Expeditionary Force—and General Mattis was part of that as a division commander—was literally still on the way coming home and there was not a requirement at that time for any Marine forces to support what has become OIF II and the follow-on stability and security operations.

Within a matter of 3 months, we went from no battalions to three battalions to six battalions to nine battalions, 31,000 marines, and now we are down to about 23,000 marines in what is essentially our fourth rotation into Iraq. We have a total—have gone through three different stages evolving to this threat after the end of the major combat operations in OIF. Responding to the needs of our commanders through urgent needs statements, we provided what is now a total of over 3,100 armoring kits, starting out with 3/16ths armor, which is what we could get them out of rolled hardened armor immediately, bolted onto the vehicles, rapidly replaced by 3/8ths inch armor as that armor and those design configurations worked with the operational commanders over there. I would like to get this as brief as possible so that General Mattis can lend

some comments because he fought with those marines and with that kit.

In addition to what is now a total of 3,100 HMMWV kits with the two varying levels of armor that I indicated, we are also procuring nearly 500 of the M–1114 and M–1116 up-armored HMMWVs. The United States Army in the Multinational Force Iraq has already kind of forward-financed that for us by giving us 100 of their vehicles in Iraq because this is a joint fight, and we will have a total of 3,600 of the HMMWV A–2 variant with the bolt-on armor as well as the up-armored HMMWVs.

In addition to that, we have nearly a thousand armor kits that are going on our medium tactical vehicle replacement (MTVR), our logistics vehicles. Deliveries for those kits are continuing as we speak. The armor for the A–2 HMMWVs will go through this spring in May. The M–1114 up-armored HMMWVs goes through this fall, and we will continue the MTVR armor kits through this December.

In addition to that, the Secretary of the Navy has been working this as a high priority over the last nearly year and a half in what he called Operation Respond, working with countermeasures equipment for aircraft and for ground systems, including electronic countermeasures equipment as well as the armor that we talked about, a variety of issues.

The Deputy Secretary of Defense has initiated a Joint Rapid Acquisition Council which, along with the other Services, principally the Army and the defense laboratories, has begun fielding new technologies and accelerating industry. A recent example of that, Senator, is that approval for 122 Cougar explosive ordnance disposal (EOD) vehicles, which are going to be designed and built in South Carolina, 65 of which will go to the United States Marine Corps, the balance will go to the——

Senator KENNEDY. General, my time is already up, but I would like to—and this is a very complete answer to a question. Maybe I can write, get information from you.

General MAGNUS. Yes, sir.

Senator KENNEDY. Just quickly, in terms of what the unmet needs today and what funding is in the pipeline, when do you think you will get what is the necessary at least request that the Marines have made, either in Afghanistan or Iraq or wherever? When will you get the last of your unmet needs, and is there sufficient funding now in the pipeline for that?

General MAGNUS. We believe between the fiscal year 2004 and fiscal year 2005 supplementals—and I must caveat it and say that this is an evolving war. This is a very thinking enemy that literally puts no cost on their side. So our needs for armor, our needs for other countermeasures and offensive equipment are evolving.

But we believe that, based upon what we know from the operational commanders now, this calendar year we will meet the requirements as we know them now, sir.

Senator KENNEDY. This calendar year?

General MAGNUS. Yes, sir.

Senator KENNEDY. I see, General, my time is—I might ask you, you can give a more complete statement for the record. If I could just ask—I know that the time is up—on the V–22——

Senator TALENT. Take your time, Senator. It is important to the hearing.

Senator KENNEDY. We have had a fire in the V–22 engine. What can you tell us about where we are in terms of that hydraulic fire testing impacting the V–22? I would be just interested if you could comment on that.

Then I see where the Fighting Vehicle, Expeditionary, has been delayed. It started in 1995. It is being delayed a couple of more years. When is that going to be resolved? You can do both of those.

General MAGNUS. Two quick bullets for you, Senator. The operational assessment testing is ongoing with the V–22. We did have an incident with a fire which was quickly extinguished and all of the fire detection and suppression systems worked as advertised. I will defer further comment on that to Secretary Young. But we believe the assessment is going very well and, yes, as in most developmental testing, we continue to uncover small areas where there are corrections. But the major issues with this aircraft are well over.

Of course, we will await the decision of Secretary Young and the Department of Defense on the future of this aircraft, but we are very positive and it is doing well.

Senator KENNEDY. Just, Secretary, maybe you would make a comment on that; and also about the reconstruction of the Expeditionary Fighting Vehicle, which started in 1995, is now delayed a couple of more years. If you could just comment on that.

I thank the chair and my colleagues for the courtesy of the extended time.

Mr. YOUNG. I concur with General Magnus. OPEVAL is going very well on V–22 and the independent Commander of Operational Test and Evaluation force approved commencement of that testing and reviewed all the test procedures. Testing continues out to the June 2005 time frame. I am very optimistic that those results will be very good. We have resolved issues.

As you have heard, there was a leak in a hydraulic line. We have gone back and inspected all of those lines and resolved a fix for the problem. The information concerning the program is consistent with what you have watched in recent times, with other programs, we are very open. We tell people when we have problems. We fix those problems, and appreciate your patience as we resolve these problems.

On EFV, we encountered some issues with the hull electronics unit's ability to control the vehicle and then in reliability of the vehicle in testing. We were probably slipping as much as 6 months. The Program Budget Decision essentially slipped the program a year. It certainly gives us some more time. It takes risk out of the program and we believe it is acceptable for the program. However, it extends the program and that will add some cost, but we definitely had some issues to resolve with that hull electronics unit and to improve the reliability of what we want to hand the marines.

Senator KENNEDY. Thank you, Mr. Chairman. I will have maybe some follow-on questions in those areas, Mr. Chairman.

Senator TALENT. I have one, Senator.

The Senator raised a couple of issues I was going to raise. What is the impact on the operational force of the 1-year slip in the EFV in your view? Obviously, you do not think it is that great because you were willing to let it slip.

General MAGNUS. Well, you see, all the initial operating capability dates slipped because the procurement ramp and rate is decreased through the psychological operations (PSYOP) dissemination battalion (PDB). So the force sees those vehicles—I think initial operational capability (IOC) is now in fiscal year 2010. It slipped out. Assault amphibious vehicles (AAV), which I noted in my testimony are 35 years old, we will have to get some more miles out of those.

Senator TALENT. I wanted to ask, General, following up on the armoring of the HMMWVs. You are planning for a new truck. Do you think that the up-armor is not working with the HMMWVs? What is the future of armored wheeled vehicles for the Marine Corps?

General MATTIS. Mr. Chairman, if I could take a shot at that. I think we have gone just about as far as we can go with the 1970s technology of the Humvee and adding armor to it. There are aspects to the design of the vehicle that limit how much armor you can put on and still have a useful load in the vehicle. We have gone, we have engaged with industry. We have a lot of discussions going on. Georgia Tech has some very interesting work going on as far as what we can do with the shape of the vehicle and the internal configuration that would build in survivability from the ground up, rather than kind of adding on the armor.

What we eventually find is that as we all try to checkmate the enemy's IED initiatives, that armor is only part of the solution. There is training solutions, there is jamming solutions. As far as the armor goes, we probably have to shift to a new vehicle. We are heavily engaged in this right now. I cannot give you any design right now that we have settled on because we have had some setbacks, as we always do when you try to break in new technology, this sort of thing. We have a lot of bright people working on it, sir.

Senator TALENT. I am going to get more into the IEDs later, but I am very much in favor of and very supportive of up-armoring. We obviously have to do it. But there is a negative side to it as well in terms of cost of maintenance and fuel costs and all the rest of it. I am pleased you are looking at a whole universe of options for force protection and not just armor, which is what we have to do in the short term.

But I guess it is too early to talk about costs or anything, which is the thing that came to my mind when I read you were thinking about doing that.

General MATTIS. It is still too early, sir. As fast as we figure it out, we will be coming knocking on your door, I am sure.

Senator TALENT. Okay. I have no doubt of that.

General MAGNUS. Mr. Chairman, if I could just quickly add to it. Admiral Jay Cohen, who is the Chief of Naval Research, working under Secretary Young, has been working in earnest with industry on clean sheet of paper designs, working with the folks that design crash and impact-resistant vehicles for things like NASCAR. Again, we are starting with a clean sheet of paper, so, knowing that we

have to operate these vehicles with human and other loads, knowing that there is more to the mission than just being inside of an armored box, and knowing that our environmental conditions may be upwards of 140 degrees. There is a lot of work going on in earnest with industry and with the defense laboratories.

Senator TALENT. Do you want to follow on?

Senator KENNEDY. Just on this, and I give my assurance to my colleagues it will be the last one.

Just on the jammers, what percent are you on for jammers, sufficient jammers? This is an issue that there have been at least some reports that we are deficient in terms of percent of jammers that we have, Marines, currently.

General MATTIS. Senator Kennedy, especially in the electronics spectrum, it is a constantly evolving threat. We do something, they do something. We have something waiting for them, they try it, it does not work, so they adapt again. We jam the radio frequency, so they go up hardwired. There is a lot of ways we address this.

Right now—and because it is an open hearing, sir, I would like to meet with some of your staff privately, but we have an improved counter-IED set of gear that is being fielded right now. Even as we are fielding it, we are recognizing we have to upgrade it, and that upgrade you have funded through the supplemental. So it is a constant mate and checkmate and back and forth.

Again, what we have to look at is the power of the enemy jammers. I do not want to go into that in detail here, but you can understand that the jammer has to overrule something and so you can see the challenge that we face, and how many vehicles have to have it. Where at one time maybe one jammer for every ten vehicles, maybe one for every three. You can see where we are going with this.

But I can give you a lot more complete answer privately, sir.

Senator KENNEDY. Thank you, Mr. Chairman.

Mr. YOUNG. Could I add a comment to that? Going back a year to the Operation Respond process, we identified, based on Secretary England's initiative, $16.5 million in procurement for the Marine Corps. We bought over 1,000 jamming systems, some on the low end of the cost scale and also some of the channel systems. We bought them anticipating the need and anticipating they would be part of the solution set, but, as the General said, not the complete solution set.

Over a year ago, we started to put jammers in the pipeline, because some of them have 12- and 18-month delivery cycles.

Senator TALENT. Senator Lieberman has been very patient.

Senator LIEBERMAN. Well, you know, that Senator Kennedy; it is the long count. No, those were good questions and I appreciate the answers.

I want to focus on the heavy lift and just to ask you, Admiral Sestak, I presume that heavy lift capacity is essential to the seabasing concept that you have described.

Admiral SESTAK. Yes, it is. I assume you are referring to vertical heavy lift; yes, sir. The 53X without a question is critical both for coming from the future expeditionary strike group and from the MPF/F of the future. In addition, if seabasing is to be of value to this Nation it has to be joint. We have actually moved a million

dollars into an Office of the Secretary of Defense (OSD) project run by the Army to look at their future heavy lift helicopter in order for them to execute their strategic maneuver from a distance, to make sure that that vessel is compatible with the seabase. Much like we use them to go off of our carriers off Afghanistan or potentially into Haiti, or the Air Force with Doolittle, that is important we make this joint.

Senator LIEBERMAN. Right. I appreciate that answer. I appreciate the joint inquiry proceeding. At a meeting of the Airland Subcommittee last week and then at the full committee this morning in the hearing on Secretary England's nomination to become deputy, there is really a growing, deepening concern on this committee about acquisition and the process by which it occurs, the increase in the price of individual items, which makes it harder for us to buy as many as both a lot of you and certainly a lot of us think are necessary. So to the extent that we can economize by cooperating across Service lines, that is good news.

General Magnus or General Mattis, I wonder whether you would comment a bit on what has been described as the validated requirement for the CH–53X and outline what needs—what critical technologies need to be mature to successfully implement the program?

General MAGNUS. Thank you, Senator Lieberman and fellow members of the subcommittee. I appreciate the opportunity again to talk about something critically important, as Admiral Sestak said, to seabasing.

To put it in simple Marine terms, what we want to do is we want to modernize our heavy lift fleet with a replacement for the CH–53 Echo that can do what we are demanding of the CH–53 Echo today that it cannot do, that is to go deeper, to carry heavier loads, and to go into a high hot environment. We have already been there and in fact our critical aircraft that went into Afghanistan with General Mattis in Task Force 58, the KC–130 to be able to do air and ground refueling and move combat loads, the CH–53 Echo to be able to do the vertical movement of personnel and combat equipment, and of course either our strike aircraft coming off of the Navy's carriers or eventually as we moved in our attack helicopters to support the troops ashore.

We would like to be able to replace this aircraft and basically we need to replace the 164 aircraft we have now with a new fleet of new production CH–53 design aircraft with elastomeric rotor heads, modern high-reliability, maintainability, and higher powered engines, with the kind of electrical and hydraulic systems and displays in the cockpit, which are available in technology today, great American technology from the power systems right on through the displays and the aircraft itself, to be able to lift loads on the order of 27,000 pounds to 110 miles.

These are not future requirements. These are today requirements. But in many cases we cannot meet them. We have to be able to displace refueling ashore. So this is not some futuristic view of what we need to do from the seabase. This is what we need to do today, and it will take us about 10 years to develop this aircraft and get it proven.

We are getting great support from Secretary Young, who is funding efforts to proceed toward what is expected to be a milestone decision this year to move out with that development.

Senator LIEBERMAN. Secretary?

Mr. YOUNG. I think that was a great question, and let me illustrate a couple of points. We believe the engine and the avionics are particular areas that need work, but have a good maturity. The main gearbox, rotor blade, and rotor damper are areas where we are at a technology readiness level of 4. That is not as mature as you would like it to be to proceed with the program.

What drives that are the requirements. The requirements are for additional capability. To achieve that, you have to have technical performance, a rotor that will lift and go further and go faster. In those areas, that is where you see cost issues. If you compromise requirements, you can control costs. I think it is a great discussion. As you said, the issue came up this morning. If you push the requirements envelope, you are going to push the cost envelope and you are going to push the risk envelope. We have identified these as the first areas of risk reduction to work to deliver that capability.

Senator LIEBERMAN. Thanks, Secretary. That is very helpful.

General Magnus or General Mattis, let me ask you. I presume that we are putting the CH–53Es under some real stress in both Iraq and Afghanistan. I wonder if you could talk a little bit about that. Of course, part of what we talked about today, this morning at the full committee, is how long it takes to get from the need, which you say is right now today, to satisfying the need, which will be 10 years from now. Nobody in the private sector would put up with that kind of delay.

Having given that speech, let me ask you what we have learned and whether I am right that the current aircraft are being stressed by their use and what we have learned in these two conflicts about what we need.

General MATTIS. Senator Lieberman, operating in Afghanistan—and granted we never thought we would be putting naval forces 350 miles in——

Senator LIEBERMAN. Right.

General MATTIS.—I will tell you that I was pushing people to the limits of man or woman and machine. That is the bottom line. We were pushing to the very edge of the envelope going into the mountains there, 350, 450, 500 miles from the ships at sea, refueling them in the air at night over the mountains.

We have continued to use these aircraft under very trying conditions at rates of use that far exceed, of course, our peacetime measures, how long we thought they would hold up based on a certain number of flight hours each month. We are flying them anywhere from four to seven and sometimes ten times what we expected to be flying them at.

So the spare parts usage and the excess wear on the aircraft means that we do need the replacement. We need to get this program under way is the bottom line. We can keep the birds flying. They are old, they are old iron. Eventually there is just so much you can do with them. It will cost more each year to maintain them. We can buy the time, sir. But we can reduce risk, oper-

ational risk. What we do not want to do is come to you with something that has such a design or cost risk that we end up pricing ourselves out of business.

So it is a balancing act as we try to take what we anticipate to be the true requirement, knowing that none of us can think of the future perfectly. I think if we were sitting in this room in 1805 we would not realize this room was going to be burned to the ground about 10 years later. We have to anticipate these kind of surprises and put our young men and women in positions where what we are asking them to do is reasonable. They will put their lives on the line. They know we are not an insurance corporation. But we owe them gear that can perform, going deeper. We do not want the enemy to be able to hide from us and have sanctuary. We need to hunt them down.

This aircraft is critical and we need to get on with explaining to you what it is exactly we need. I think it is in process, but it is a challenge technologically and even operationally to make certain we keep the balance.

General MAGNUS. Senator, if I could just quickly add on to what my shipmate said.

Senator TALENT. Yes.

General MAGNUS. We have already begun putting some of these aircraft into desert storage. We will not fly an aircraft that we knowingly believe is materially unsafe. Clearly, from a maintenance point of view we will not do that. In last year's supplemental we pulled the first aircraft out of the desert that had already been retired, to send it back into rework so that we could bring it up to operationally safe standards.

But there is an attrition over time, both through peacetime losses as well as fatigue, the old iron that was mentioned, where we absolutely will need to have replacement aircraft because we will not be able to remanufacture the ones that attrite, in the 2012 to 2014. I share your frustration, Senator, and I also share the Secretary's concerns about making something so hard that the risk goes up and it becomes unaffordable in the sense that we will not be able to get what we need.

We intend to work in earnest with our shipmates in the Navy and with the acquisition executive to continue this program along a strong path to get this new aircraft in development as soon as possible.

Senator LIEBERMAN. Thank you.

Secretary, let me ask you just a final one or two questions. Having heard this, it is somewhat like the conversation we had last week, but is there enough money in the pipeline to expedite basically the lessons learned, in a more direct sense to mature the critical technologies that the Marines know from experience they need? I know there was a recent GAO study that pointed to three critical technologies that are needed for this H–53X, CH–53X.

Mr. YOUNG. Let me provide a couple answers. I actually had a T–45 example I wanted to use as an illustration, but I will just say, the program that is in the President's budget request for fiscal year 2006 to 2011 is funded assuming what initially started as a remanufacture program for the CH–53s. The decision has been for

some time now that it should be a new build program. That will cost more money.

The independent cost estimate and Sikorski's estimate are indeed for something on the order of an additional $800 million. As you and I had a chance to discuss last week, I have been anxious that the enterprise identify those funds. Could the program go faster? That is conceivable. However, across the Department, there are cases where we do not execute the best business case and sometimes we do take 10 years, because you have to balance the need across the enterprise for resources.

This program is short of funding right now based on the current information we have that changes it to a new build program. We have adequate funds for the risk reduction efforts. We will definitely have to adjust the profile as long as the requirements stay where they are. This is a healthy discussion about whether some adjustment in the requirements will get us to a "knee" in the curve where we are getting the maximum amount for the taxpayers' dollar instead of extra requirements. But, we have to get that system that is easily put in the hands of the warfighter and they can use it, as General Mattis has seen, to the extreme conditions.

Senator LIEBERMAN. How do you—this will be my last question. How do you determine that? Those are very reasonable questions. They need a new fleet of aircraft and you are asking a very practical question, that maybe we have to settle for less than the ideal so long as we are giving the Marines a new fleet of heavy lift aircraft that can do the job that we ask them to do better than the existing fleet.

Mr. YOUNG. That is exactly what is going on right now with some of the study funding you asked me about last week that are committed and released. The acquisition team is working extensively with General Mattis and the Marine Corps team to talk about which requirements are costing more, which requirements if relaxed could yield savings, and which requirements are just not compromisable because you have to have the capability to meet the mission.

As I said, that is a healthy discussion and these are critical discussions at this early phase of the program. Once these issues are settled, we need to make a funding commitment to this program and move forward. But, those issues need to be settled now and not changed midstream, because change will drive the cost in the program.

Senator LIEBERMAN. Just a final quick question. Do you think that you are going to be ready in this budget cycle to tell us what additional needs you have to put adequate money in the pipeline to get this program moving more quickly?

Mr. YOUNG. I think we may know by mid-summer. During the next couple of months, we are supposed to have updated independent cost estimates, an independent non-advocate review of the program, somebody independently looking from outside, and then completion of these discussions on requirements. So yes, I believe so.

Senator LIEBERMAN. So if the DOD authorization bill moves as slowly this year as it did last year, that will be plenty of time, even though we hope that it does not move as slowly.

Mr. YOUNG. I think we will be late to your timely movement of the National Defense Authorization Bill, sir.

Senator LIEBERMAN. Thank you.

Thanks, Mr. Chairman.

Senator TALENT. Let me just strike while the iron is hot, because I had a question about the 53 also. Do I understand, taking your answers as a collectivity, that you are committed to a new build solution to this concern? Because you have this independent review ongoing and my understanding is that they are going to report on alternatives to a new build, maybe going back to a service life extension program. But are you committed to a new build and just concerned about balancing capabilities and costs? Or are you actively thinking about an alternative to a new build on the helicopter?

Mr. YOUNG. The FYDP reflected in fiscal year 2006 the President's budget request has $3.376 billion for system design and development of the H–53X. According to the independent cost estimate and the company's estimate, that is not enough money for a new build program. If the requirements stay at new build, the decision is new build, we will do new build as long as the enterprise finds the money to fully fund that program. I cannot sign a contract for a program that is not fully funded.

Senator TALENT. It sounds like there are issues you have not reconciled which might affect the decision about going ahead with the new build program. I am not being critical.

Mr. YOUNG. No, sir, I understand. I cannot commit to new build unless the enterprise is going to commit to fully fund it. That is my hesitation.

Senator LIEBERMAN. Then the enterprise you are speaking of is the Marines or us?

Mr. YOUNG. Department of the Navy and Department of Defense.

Senator LIEBERMAN. Okay.

Senator TALENT. I think I will start referring to us as an "enterprise." Nobody will know what we are talking about. [Laughter.]

It is a pleasure to have Senator Clinton with us at today's subcommittee meeting, and thank you for your patience.

Senator CLINTON. Thank you very much, Mr. Chairman, for your courtesy. I am not a member of this subcommittee, but there are two issues that I am particularly concerned about that I would like to inquire of both—in the first instance Secretary Young, in the second instance the Admiral.

Secretary, I wanted to ask about the recently awarded VXX Marine One presidential helicopter program, which was recently awarded to Lockheed Martin Systems Integration of Owego, New York, after a very exhaustive competition. It was a tremendous example of what competition can bring, because they were both excellent proposals. It was also a terrific example of what DOD does in the face of a great competition by conducting a highly detailed and disciplined source selection process.

The end of that process led to the awarding of the contract to Lockheed Martin. There have been questions raised. Obviously, we understand the reasons behind that. But now that the contract has been awarded, we think it is important we proceed expeditiously.

I strongly support therefore the President's budget request of $936 million for VXX development in fiscal year 2006. Can you provide a brief overview on what full funding of that request in 2006 is important to keep the program on track?

Mr. YOUNG. At a macro level, I would start with what we said when we announced the program.

There are risks out there in the environment. We obviously would not carry the President in a vehicle that was not safe. We can improve the safety, security, and performance of the vehicle. There is urgency to move forward.

We received proposals from companies that said they can deliver a product that is significantly more capable and safer on the schedule we had outlined. We are going to have independent executive reviews and I will personally monitor the progress of the program. We have the first review scheduled for myself to chair here in the next month or so. This program unquestionably has some level of risk, I think a level of risk that is merited in light of the need to give the President more capability.

We delayed the source selection, as you are well aware, so both teams had more than adequate effort to propose and fully understand what we require. They made excellent proposals, they understand the level of integration and the complexity of the challenge we put before them.

So, within our budget request, those funds are critical to get started with those efforts. Those funds include money to buy the first three helicopters, which we intend to put significant test hours on. I would tell you that every aspect of that budget is somewhat timely relative to the fact that we extended the source selection to make the best possible decision. We are now prepared to move forward. Both companies have come in with plans that tell us they can execute and also tell us that having the funds to begin integration and test at an early stage is critical to having any chance to make the schedule.

Senator CLINTON. I appreciate that, Mr. Secretary. Obviously I have some experience with Marine One and adding to the defensive capacity of that helicopter is critical in these times. So I hope that we will vigorously support the President's request so that we can get this moving in a very expeditious manner.

Admiral, I would like just to ask about the planning process that is leading to the recommendations coming out of the Navy in light of the information now available that confirms China's very significant investment in a blue water navy. I think that we talk, rightly so, about the challenges we face from IEDs from the current war that we are fighting against the enemy that we have on the battlefield at the moment, but I am increasingly concerned about what additional measures and planning we need to undertake to ensure that our Navy remains superior.

It would be helpful to me to just get some brief overview from your perspective as Deputy Chief and also the work you have done—you have been very involved over the years in all kinds of planning and strategic assessments—where we are in that process at this time?

Admiral SESTAK. Senator Clinton, thanks for the question. Without going into classified material here, at the one end of the spec-

trum, as you rightfully said, we plan for the global war on terror. Often it is finding the needle in the haystack: where is that IED, where is that terrorist crossing the sea among the 86,000 merchant ships at sea today—which is one challenge.

At the other side of the spectrum, we see three potential major conflicts which we plan for. Let us talk about one we have done extensively in the past 2 years through campaign analysis. We see three major challenges. One is access. Where the global war on terror is finding the needle in the haystack, in a major conflict we have what you might say is a saturation strategy—a lot of submarines, a lot of mines, a lot of ballistic missiles. Not just one nation; there are several that we have to think about, much as before World War II, we thought about different nations.

That takes a different type of planning. It takes speed to get inside their ring prior to their being able to shut us down. It takes persistence. You cannot just deploy from the United States. You need to be there already. So in our approach to this we look at several aspects of our capabilities—that are absolutely critical. The submarine force. How else can you be there, inside someone's door covertly, even today?

But we do not look at future warfare as platform on platform. That is the massive change. That submarine can lay a lot of individual distributed sensors on the ground, the bottom of the ocean, that can begin to track submarines. Once an enemy submarine goes past our submarine towards where the seabase is, our submarine can say: here it comes, and here comes another and another—and those distributed sensors, networked, begin to track in force.

Second, we have to have the capability to shoot not just the arrows, scores, hundreds of potential archers that are shooting lots of arrows towards us, ballistic missiles and anti-ship cruise missiles. To do that, we have to do three things.

Please, Senator, if I go on too long stop me, but this is something pretty important. The Navy is, as we are engaged somewhere else, really a strategic option elsewhere for what is primarily potentially a maritime conflict. But needs to be joint. We cannot win without the other Services.

Take that archer, that transportable erector launcher, the one that comes out of the mountain, scoots out, and we have 1 hour to shoot it before it all shoots a lot of arrows. So we need to be able to have time-critical strike. We need to be able to see him scoot out and that takes a space capability. We can be over any country in peacetime with space and be able to network back to some missile to shoot the archer.

Second, it takes information operations, the ability to make a missile go awry, software—soft power, I mean.

Third, it takes the ability to protect the seabase from the missiles that still are coming down, the last few. More important than that we cannot just protect the seabase. The Navy of today can no longer say, as it did in the Soviet Union days, I will get command of the seas and 4 weeks later I will finally show up off of Europe with 15 aircraft carriers and say, I am going to defend, help out, in a war that is probably over.

In most conflicts of the future, we talked about speed, getting the marines there quickly—think if we could have done that with Saddam Hussein in 1990. We might not be there today. Speed.

So that means that we have to have the ability to see the remaining arrows come down, but also protect the ports and the airfields that our sister services are going to flow into, or else they will not be able to help us in the fight.

So in summary, what I see in the future, at this end, is a Navy, which I mentioned, that hopefully keeps the dog from barking. It is the Navy that is able to say to another nation, today is not your day. Where that military person on the other side begins to turn around to his political master and says: today is not my day. It includes forces forward every day. Today one-third of your Navy is overseas, one-third, immediately employable, to lay the sensors to tell us about the submarines, to join up with the joint force to see the archer, and to be able to have the ability to shoot them down or make them go awry—and that takes DD(X), CGX, and all.

If I could, one last item. I will never forget the briefing by General Schwarzkopf at the end of 283 days into Operation Desert Storm. He said to the question from a reporter that queried why the Marine Corps waited a moment, a little bit, before they went over the berm because they had to clear a minefield. The General looked at the young reporter and said: Son, have you ever been in a minefield? Which Schwarzkopf had in Vietnam.

Today we plan to put our sailors and men and women at sea into scores of mines; but in the future, we finally will have a craft—you are familiar with the Littoral Combat Ship (LCS) that is going to finally put unmanned vessels forward to sweep in stem prior to our sailors, similar to our marines, go forward so they know where the mines are not.

So in summary, we could go into, and I would be happy to give your staff a detailed classified briefing on this, but it is truly one where we believe properly positioned, with the right capabilities procured, it is a Navy that can help say to someone that truly has interest in regional influence that, today is not your day.

Senator CLINTON. Thank you.

Thank you, Mr. Chairman.

Senator TALENT. I thank the Senator for her participation and would like to invite her any time she wants to come to the subcommittee.

General Magnus, one more question about EFV for you. You were quoted in a Defense Daily article as talking about the reason the schedule needed to slip was to reduce risks. I take it you would agree with what Secretary Young talked about in terms of the risks that we are trying to reduce with EFV?

General MAGNUS. Mr. Chairman, yes, I would agree with what Secretary Young said.

Senator TALENT. Anything you want to add or any particular insights?

General MAGNUS. Sir, given the opportunity, of course a marine will take it. In actuality, the schedule——

Senator TALENT. That is what you have common with Senators. [Laughter.]

General MAGNUS. The schedule has moved a little bit more than 1 year to the right. Certainly we have—with that, we are going to do risk reduction. This system is doing well. Just like other systems developments, we will uncover things that need to be changed in terms of design. What we are most concerned—since we are demonstrating great performance with this vehicle now, the 30 millimeter cannon is operating remarkably, the water speeds are demonstrated in excess of 30 knots, and we continue to work that. But of course, system reliability and maintainability and habitability for not just the crew, but the combat marines that will be riding in the back, is something that we want to make sure that when we deliver this to the operational forces later on this decade we are delivering all that this system and General Dynamics and our SYSCOM can deliver.

However, some of the shift to the right in this program was simply because of overall DOD affordability considerations. So we have been able to—the good part is that we are mitigating risk in this program, that we have great—even if they are older, the legacy AAVs, which we have built with the Bradley suspension system and they are doing awesomely well and have done awesomely well over the last 2 years—but this is like the iron we talked about with the replacement for the CH–53 Echo. We are using in particular light armored vehicles and our armored amphibians at up to eight times the rate.

Unlike where you can replace a lot of dynamic components like transmissions, we are talking about the hull form and the suspension itself. These are doing awesomely well and, although they did not do the classic amphibious assault, they have crossed rivers in Iraq where there were not any bridges or the bridges were blocked, and they knocked down buildings in Fallujah late last year, and they have shown a remarkable capability and we are looking forward to a modern replacement that, quite frankly, is also going to be capable of operations in a contaminated nuclear/biological/chemical (NBC) environment.

Senator TALENT. All throughout the service we have legacy platforms from the Cold War era that are being deployed at a tempo of operations (OPTEMPO) far more than we thought they would be when we bought them and doing things that were not exactly anticipated, because we are fighting a very different kind of war than we anticipated. We are all having to scramble to adjust.

So you think the EFV emerges from the Quadrennial Defense Review (QDR) unscathed, despite the program costs, which is what, $13 billion, something like that?

General MAGNUS. The program cost before the schedule was adjusted last year was slightly over $8 billion, again extending that out past the FYDP. Obviously, as we move it to the right we will incur costs simply due to the inflation and other reasons.

As far as what is going to happen at the other end of the QDR, I think this is a system that has tremendous capability as one of our primary surface connectors in forcible and rapid entry operations from the sea. I think, recognizing that it is part of a system of systems in seabasing, but is critical to the combat projection of Marine maneuver forces, I think it should do very well in the QDR.

Senator TALENT. Yes. It is pretty central to what we all understand the Corps to be doing, is it not?

General MAGNUS. Yes, sir. The Expeditionary Fighting Vehicle, the MV–22, and the heavy lift replacement aircraft are fundamental to projecting Marine maneuver forces ashore.

Senator TALENT. So is DD(X), but we will not get into that.

Admiral SESTAK. He meant to mention it, sir.

Senator TALENT. General Mattis, let us talk about IED. One of the advantages of having other Senators go is that takes things off the plate. There were some really good questions in areas that I had intended to address, but we did not get very heavily into IEDs.

I know the Corps is investing a lot of energy in looking for ways to detect and neutralize IEDs. Let me ask, if you can, in an open hearing what conclusions you are drawing from those studies. I am also particularly interested in your opinion of how the Joint Task Force is working and I would like your assurance that the Corps in its own studies is working very closely with the Joint Task Force. We do not need a bunch of stovepipes out there.

I bet anything you are going to tell me that you are working closely with them, but expound a little bit on what you are finding and where you think all that is going.

General MATTIS. Sir, in country, in Baghdad, we have marines on the Joint IED Task Force, the ones who do the forensics, this sort of thing. The information-sharing—I could tell you within hours, if First Infantry Division got hit by an IED, I could tell you what had happened to them in the First Marine Division area. The information-sharing is real-time and it was very, very effective for us. As we tried to anticipate as tactics and techniques were passed around amongst the enemy, we could be in a position to block them.

If I were to sum up everything I have learned about fighting over the last 30 years, it is improvise, improvise, improvise. Nowhere is this more obvious than with the IEDs. We were actually hit with the first of them before we came out of Iraq from OIF I down in the southern area, an area called Northern Babil Province. The initial ones, sir, had tripwires on them, tripwires going across the road. The enemy does not care one bit if they kill innocent people. To tell you the truth, we are ready to fight them, but their ruthlessness toward even their own people was still a bit of an eye-opener to us over there.

As we adapted to that, and there are very easy ways, as you can understand, how we would adapt to something that obvious, and they went to the hardwire. These were people in a part of Iraq where they built all of Saddam's munitions. It is the area south of Baghdad running down toward northern Babylon. In that area, the enemy adapted very, very quickly. So we were working with them at the same time, almost working alongside the enemy. They do something, we would do something. They would see what we were doing, and it would go back and forth.

Today what we have matured to are a number of radio frequency interrupters, jammers, this sort of thing, that identify different parts of the spectrum. I will tell you right now how we can reverse the whole construct of this war: Find something that will prematurely detonate IEDs. At the Office of Naval Research (ONR),

Defense Advanced Research Projects Agency (DARPA), and other places—I will not go into the details—there are people who are striving valiantly for this and working some very long hours.

Senator TALENT. Everybody is working for that and I just hope that they are sharing information.

Let me just take you down that road a little bit, because you mentioned before how ruthless this enemy is. He is also very highly adaptive. You really have to on that level respect them. My concern is that our efforts not be so technology-based that we think that there is a technological silver bullet, because—it would be great if we could come up with something that would prematurely cause those things to explode, but then they might be able to find a way around that as well.

General MATTIS. Right. Sir, we are more adaptive than the enemy is. That is one point.

Stovepipes would be a concern. If we do not have some way of fusing all this together, we could have people stumbling through experience-based learning that somebody else has done and some other university had already picked up on, this sort of thing. The Secretary of the Navy has funded every one of these issues. He has told me there is no budget on this. He says, whatever you need.

We have a few surprises for the enemy. I am here alive today thanks to one of those surprises, I can go into detail on, and I will salute the Air Force on that one. But you are right, it is not all based on technology. Marines with rifle scopes on the rifles, we put them out—where we used to have about a dozen snipers in each battalion, now we have hundreds of men in each battalion carrying scopes on rifles—are able to spot the little antenna alongside the road. We never imagined that, but you give the gear to the young men, they will figure out how to best use it.

Senator TALENT. So you think the training for force protection, situational awareness, all that, you are satisfied?

General MATTIS. We are never going to be satisfied, but we interview every one of the grievously wounded young men that comes to Bethesda. These would be the worst wounded that we have, and we have them be the ones who grade our training, our predeployment training on us.

We have made subtle variations to the training based on their input, but overwhelmingly we have received very positive responses from them about the quality of the training and preparing them for this.

Senator TALENT. How would you sum up intelligence that you are getting and what role that is playing?

General MATTIS. Ninety percent of the intelligence we get on IEDs comes from Iraqi people. They are the ones who call our tip lines. As fast as they would set off a bomb in a marketplace, we would have pictures of the bruised and dead up on the walls there in that same market hours later, with a tip line for people to call.

The intelligence is good, but we work closely with the Royal Marines, the French Marines, and the Los Angeles Police Department before we got sent back in. We had just gotten home, we got the word we were going back into the Sunni Triangle, Fallujah, Ramadi. They explained about community policing, and it is remarkable how consistent Los Angeles Police Department policing

the barrios, the Royal Marines in Northern Ireland, the French Marines in various places around the world. There are very common techniques that they all use, and it is all intelligence-based.

We also get a fair amount off signals intelligence I will not go into in this hearing. But it is that combination of a little technology kind of intelligence, primarily human intelligence, and the old policeman on the beat way of picking it up.

Senator TALENT. I hear it is getting better. It got better after Fallujah and better still after the elections. Is that your sense also?

General MATTIS. That is absolutely the case, and I think the number of attacks and the casualty rates, plus the enemy's more desperate attacks, where they are attacking the forward operating bases now. That will be a quick trip to disaster for them, as we have seen on two cases. It will be a tough fight, but we will always win those.

When they come out like that, they are losing their suasion over the people and they are losing the capability the IED once gave them, driving them to something that is very, very dangerous for them.

Senator TALENT. This is a war you are winning. As Secretary England said, this is a war we have to win, not just for Iraq but for the whole global war on terror. Very pleased to hear that you are doing the lessons learned with the British and the French and Los Angeles Police.

I do not know if you have felt this way, but I am going to say it for the record. When you talk to these young marines and soldiers, their ability to go out among the populace and move from one role to another, their sense, the instinct that they have—and this is stuff they have been trained up in in the last couple of years, because they did not have that in basic or anything like it, to be a sort of a general policeman in one instance, and then just a friendly person making contact, somebody getting intelligence, and then maybe having to turn and be a warrior the minute after that. It is just incredible, the skills that they have developed.

I just, I am lost in admiration for them, their ability to handle those situations.

General MATTIS. I have seen the same thing, Mr. Chairman, a marine literally shoot an enemy down, handing out candy within 2 or 3 minutes to a little kid, and then driving off and waving to the people, without any of the potential racism or any of this kind of negative stuff. They are doing us proud, sir.

Senator TALENT. It is an essential role.

You are satisfied we are capturing the forensics? When one of these things goes off, we are going out and getting it and sending it back?

General MATTIS. One hundred percent confident. Now, that is when you can get something. There are times, sir, if they put off something that has 500 pounds and it takes apart an M–1 tank, all you can say is one heck of a big bomb, because there is probably not much left around of even the detonating material, or it is a half a mile away, blown off into some bushes.

So where it is possible, there is a very good forensics data collection and passing around of what we found.

Mr. YOUNG. Senator, may I add some comments?

Senator TALENT. Go ahead.

Mr. YOUNG. I cannot add to the experience level, but I wanted to assure you that—and you have heard from Secretary England—he meets every month or so on OIF updates, and that has been the senior leadership drive that has helped force several of these issues. We have done things across the board including an ONR initiative with small business to look at any idea out there for counter-Soviet shoulder-fired antitank grenade launcher, counter-IED, counter-mortar fire.

In the Secretary's meetings, in the Operation Respond meetings, we have asked Army Rapid Equipping Force (REF), and Army personnel to come to either set of the Secretary's meetings. We were injecting every idea we have into the Joint Task Force. So could we improve? Maybe. But we are doing everything we can to share ideas. There is no pride of ownership here in what we are doing.

We are looking and we have used every available tool out there, too. The Marine Corps has been a leader in using military off-leash dogs to go and inspect. We have applied our aircraft and our aircraft sensors in unique ways to find these devices. We have exploited every tool we have available to us in trying to address the problem.

Senator TALENT. This is a subject that interests me, so I bring it up at every available opportunity. I have been pleased, and with the emphasis from the top with Secretary Wolfowitz, and I am satisfied that Secretary England is going to do the same thing, assuming he is confirmed, as I hope he is.

So I am pleased at that. We just have to consistently emphasize every aspect of this to keep these people on the run. I like to make them sweat, too. Instead of us worrying about when the next one of these things is going to go off, make them sweat about whether a Special Ops guy is going to be at whatever safe house they think they are hiding at that night.

Let us switch into my last set of questions. I want to talk a little bit more about seabasing. Admiral Sestak, I appreciated your vision. We are still at such an early phase of this. I guess I do not want to get too much into details of it. From what I can see in terms of your planning, you programmed $6.6 billion for MPF ships, which is about $1.7 billion apiece. Does that include, by the way, ship to shore connectors, intratheater capabilities, or would that have to be added later?

Admiral SESTAK. That particular line does not, sir. There are four landing craft, air cushion-type vessels that are funded to get the marines ashore, as well as that vertical lift we talked about, the CH–53E.

Sir, let me answer your questions. I want to make sure I am not wasting your time.

Senator TALENT. I am not going to go heavily into this because I think it is still a little bit too early and I just do not want to have a vague back and forth here. But we were talking before about affordability versus capabilities and the fact that we may want a capability but then we look at whether we can afford it and then we start asking can we do this some other way.

Now, you are a very strong supporter of seabasing. I am a very strong supporter of the current Chief of Naval Operations (CNO)

and this is part of his whole Sea 21 concept. I have gone along with it, but I have to ask myself, as I understand it it seems to me like seabasing will take over a responsibility that had previously been performed by other parts of the force besides the Navy, in other words securing land bases from which we could operate, and that was done diplomatically or militarily. It depends on what war or engagement we are talking about.

Now it seems that what we are going to develop is the ability within the Navy to do that at sea, I guess on the assumption, which I think is probably correct, that there may be difficulty in getting adequate land bases to operate from.

So I guess the question is, in view of the fact that it looks like it is going to be expensive going in, we are all struggling to find more money for ships, is this a responsibility that we want to undertake within the Navy or should we within the overall structure of OSD say, you know what, we are going to anticipate where the conflicts may occur, we are going to try and secure the land bases that we need; diplomatically, however, if we cannot, we will task the Marines or we will task the Army to go and take a land base, because we may never have to do that and it will probably be less expensive than building all these ships and this whole seabasing concept?

Now, I am talking on a conceptual level here.

Admiral SESTAK. Yes, sir.

Senator TALENT. Give me your answer to that.

Admiral SESTAK. Sir, I think it goes back to what do we believe. Do you believe that we will have access in 20 years? Turkey did not permit us complete access to this last war, a North Atlantic Treaty Organization (NATO) ally. We were limited to what we could bring into several NATO nations for weapons in recent times.

Do you believe that we had access for Afghanistan on day one? No. It took us a couple weeks to months to get a base to operate from from Uzbekistan. So from the sea went the first foot soldier, from an aircraft carrier. Did we have access to Haiti? No, and again, it was from the sea as well as from the air.

So it comes back to what do we believe. Do you believe that we want to have the United States have to ask for a permission slip from an ally, a friend, a neutral nation, for what is our vital interest overseas? If the answer is yes, you have answered—not you—this Nation has answered the question.

But the trends have been such, if you look at the 1960s, from many bases overseas, to the very recent past, and a study done by DOD of what forces we want to take back, such as from Europe, the question becomes what do you want: to either leave forces there that you can use with surety or to assure you have a right to use any forces?

So, sir, actually I believe two things. One is that this is not a revolution we are talking about; it is a natural evolution, using two-thirds of the face of this Earth as a base that we command. Nobody, nobody, doubts the ability for us to own that base. It would be a shame for us not to think about having the Marines capture a base, but they have one way truly to get there. They can pull into a port, like they did in OIF, and administratively offload their tanks and their Light Armored Vehicles (LAVs) and line them up,

like that picture I showed and hope, like I pointed out with Senator Clinton, nobody has a missile that is going to rain down on them in the 30 days or whatever it takes.

Or we can also come from the sea, as a United States force, as we did in Afghanistan, as General Mattis did, coming from an expeditionary strike force, he went in with a Marine Expeditionary Unit (MEU). We can build that force, but then you come to the point—the devil unfortunately is in the details.

Senator TALENT. We have to make sure that the sea base is survivable as well. They can shoot missiles at that.

Admiral SESTAK. Yes, sir.

Senator TALENT. If you are looking at a peer competitor possibility, what is going to happen to the cost of these ships to try and ensure survivability?

Admiral SESTAK. Two answers, please, because this is such an important issue. How do we own the seas or not use the seas? So, we are on the cusp, I believe, in the next few weeks of having an affordable—an affordable—Maritime Prepositioning Squadron that meets the requirements that, by and large—and we have another little portion here to look at, as we have been talking to Mr. Young recently—of being able to have an option that truly is affordable to put a brigade from the sea, not just prepositioned, but expeditionary. I could go into those details if we need it.

But it also brings me back to the second issue. I can surely remember reading about the battleship sailors that said: How can you build an aircraft carrier that is half empty with a great big hangar? It will never survive. The one thing the Marine Corps never lets us stop thinking about is what we call the sea shield. Sir, that is why, while MPF(F) is absolutely important and a marine coming off a commercial standard ship potentially, it is still a warship if it can be protected sufficiently. But what this Congress has thus far funded and why the CNO feels so confident about it is this: we are going to put standard missiles, air-to-air missiles in concept, on an aircraft in the sky, an E2C Hawkeye. It is going to be up there, not physically with the missile, but as soon as it sees a missile with its new radar, the Radar Modernization Program (RMP) radar, connected by a Cooperative Engagement Capability (CEC), Cooperative Engagement Capability Link, we can merely push a button on a surface ship and, instead of waiting for that missile coming over the horizon at 10 feet above the water where a ship cannot shoot until it is 12 miles away even though it is an Aegis, it can shoot 100, 150 miles away, based upon what the E2C can see.

So the shield and the modeling we have done shows that, yes, with surety we feel this platform on the greatest maneuver space in the world can be defended. Not just conceptually, sir, for the details we do have here finally, after the last year of work.

Senator TALENT. Secretary Young, do you have any comment you want to add?

Mr. YOUNG. No, I think that is a great description. We just have to work very hard. It is just like the H–53 discussion. The acquisition team is working very closely with the Marine Corps and the Navy to say these capabilities come at a price and where are your

balancing levels. We need to bring you an affordable program. I think you have hit on exactly the right issue.

Senator TALENT. This is exactly what the QDR is supposed to look at, is it not?

Mr. YOUNG. Yes, sir.

Senator TALENT. To reexamine assumptions going in.

All right, let me see if I have anything else. No, I think we have covered it. It has been I think a really informative hearing.

We will leave the record open for questions that we may submit for written answers, but I do thank you all for your time. The subcommittee is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JAMES M. TALENT

CH–53X HEAVY LIFT REPLACEMENT PROGRAM

1. Senator TALENT. Secretary Young, at the April 6 Airland Subcommittee hearing, you testified that you had concerns regarding the CH–53X program. I understand that you have released $50 million to date for fiscal year 2005 risk reduction efforts. I understand that you are withholding an additional $50 million until you receive the results of an independent review team (IRT) of the program. I understand that one of the items you expect to hear from the independent study team is other alternatives to the new build program. Does this mean you challenge the results of the formal Analysis of Alternatives (AoA), and if so, could you please tell us of your specific concerns?

Mr. YOUNG. While I'm not challenging the results of the formal AoA, I am concerned about the overall affordability of the Heavy Lift Replacement (HLR) program. This is particularly true given the current fiscal environment, and the challenges of continuing to balance recapitalization for obtaining new capabilities while simultaneously sustaining the legacy fleet aircraft that are performing magnificently in current operations. Because of my concerns, I directed that an IRT be established to assess the HLR program-of-record. This IRT is evaluating system trade-offs, analyzing capabilities versus requirements, and will provide recommendations for economical and efficient acquisition approaches. The goal of this process is to aggressively pursue all options that will result in the most effective and efficient use of our resources given today's fiscal constraints.

2. Senator TALENT. General Mattis, do you agree with Secretary Young's assessment?

General MATTIS. While I'm not challenging the results of the formal AoA, I am concerned about the overall affordability of the HLR program. This is particularly true given the current fiscal environment, and the challenges of continuing to balance recapitalization for obtaining new capabilities while simultaneously sustaining the legacy fleet aircraft that are performing magnificently in current operations. Because of my concerns, I directed that an IRT be established to assess the HLR program-of-record. This IRT is evaluating system trade-offs, analyzing capabilities versus requirements, and will provide recommendations for economical and efficient acquisition approaches. The goal of this process is to aggressively pursue all options that will result in the most effective and efficient use of our resources given today's fiscal constraints.

3. Senator TALENT. Secretary Young and General Mattis, in a recent report on selected major programs, GAO stated that there were three critical technologies that must be matured for the CH–53X program. I understand that of the $50 million released to date for risk reduction, only $3 million have been dedicated to these technologies. Do you believe this is sufficient financing to address these three critical technologies, and if not, how much more should be dedicated?

Mr. YOUNG and General MATTIS. The Navy has allocated funding amounts to the three CH–53X Critical Technology Elements (CTEs) that are consistent with the very early stage of the program. At this stage in the acquisition process, which is prior to formal program initiation, the program office is engaged in a broad range of concept studies and trades analyses. These efforts support an understanding of the user's requirements; definition of subsystem technologies and their alternatives; cost estimations; and the complete range of planning for an efficient and executable

program. A sustained emphasis has been placed on fully preparing for the System Development and Demonstration (SDD) efforts that would begin shortly after a successful Milestone B decision. Efforts to mature CTEs are a part of the total effort in this pre-Milestone B environment; the Navy is doing as much as is possible in the pre-Milestone B environment for the CTEs while continuing to work towards a near-term Milestone B decision. Once MS–B is achieved and entry into SDD is approved, significant amounts of funding and effort will be expended to mature the CTEs in accordance with approved Technology Maturation Plans, ensuring a successful conclusion to SDD.

4. Senator TALENT. Secretary Young and General Mattis, how do you assess the executability of the program given that only $3 million have been invested for these critical technologies?

Mr. YOUNG and General MATTIS. The CH–53X program, currently known as the USMC HLR program, is developing an acquisition approach that will ensure the program's executability. The Milestone Decision Authority will closely examine the program for executability at the program's Milestone B review, which will be the first Milestone review for the CH–53X program and signify formal program initiation. A Milestone B review not only assesses technology maturities and maturation plans, but also includes assessments for stable and well-defined user requirements and baselines; an efficient and realistic schedule; full funding and affordability of the program; and compliance with all statutory and regulatory mandates for program plans and documents. The program office, supervisory staffs, and independent agencies are actively scrutinizing and refining preliminary CH–53X engineering, logistics, contractual and other program strategies and budgets to ensure successful execution of the HLR program following formal program initiation.

5. Senator TALENT. General Magnus, do you need a heavy lift helicopter given the fact that the Marine Corps is getting ready to build the MV–22 Osprey?

General MAGNUS. Yes. The MV–22 is a medium lift aircraft designed to replace our aging medium lift CH–46E and CH–53D helicopters, while the HLR will replace our aging heavy lift CH–53E helicopters. The MV–22 will function primarily as a troop carrier and is also capable of transporting external cargo up to 10,000 pounds. The speed and range of the MV–22 make it essential in transporting large numbers of marines long distances such as those envisioned in Expeditionary Maneuver Warfare (EMW) and Seabasing concepts. Studies have shown that the capability to move troops over long distances rapidly is indispensable to executing this concept. The HLR is the Marine Corps' vertical heavy lift aircraft and will be capable of moving a 27,000 pound load 110 nautical miles. This is critical in providing the ground combat element with the equipment and logistical support they need to conduct EMW and Seabasing.

6. Senator TALENT. General Magnus, what is the operational concept of the employment of the MV–22 Osprey and the CH–53 helicopter?

General MATTIS. The MV–22 is a medium lift aircraft designed to replace our aging medium lift CH–46E and CH–53D helicopters. The HLR will replace our aging heavy lift CH–53E helicopters. Together, the MV–22 and HLR will provide the air connector capability to the EMW/Seabasing concepts, where the Expeditionary Fighting Vehicle (EFV), Landing Craft Air Cushion, and high speed vessels provide the surface connector capability. Air and surface connectors are an integral part of the Seabasing pillars necessary to execute EMW. MV–22 specific missions include expeditionary assault from land or sea, raid operations, medium cargo lift, tactical recovery of aircraft and personnel, fleet logistics support, and special warfare. The Heavy Lift Replacement will fill the vertical heavy lift requirement not resident in any other platform that is necessary for force application and focused logistics envisioned in Seabasing and joint operating concepts.

EXPEDITIONARY FIGHTING VEHICLE PROGRAM

7. Senator TALENT. General Magnus, you were quoted in an April 7, 2005 Defense Daily article as saying, "The Pentagon took the money out of EFV, in part because the program probably needed to slip schedule a year to reduce some risks. A lot of things concern us." What are your concerns with the EFV that lead you to say that a 1-year slip was "probably needed?"

General MAGNUS. The EFV program has been executing an aggressive developmental test (DT) program on the second-generation prototypes. This testing is designed to identify technical issues, including those causing Operational Mission Fail-

ures. The program has identified and developed solutions for the top reliability drivers, including hydraulic system improvements and hardware and software changes for the Hull Electronics Unit (HEU). Design changes will be incorporated into the vehicles this summer to resolve the identified problems. The additional time provided by the 1-year change in the production decision will enable the program to perform follow-on DT on the modified vehicles prior to the conduct of the Operational Assessment scheduled for early next year.

8. Senator TALENT. General Magnus, what is the impact on the operational force of the EFV restructure?

General MAGNUS. Delay in the fielding of EFV equates to a delay in the realization of our emerging operational concepts such as Expeditionary Maneuver Warfare (particularly Ship To Objective Maneuver) and Seabasing. EFV is an enabler of these concepts as it provides the requisite mobility, lethality, command and control, and force protection to turn these concepts into fielded capabilities. A delay in EFV fielding also puts pressure on the legacy Assault Amphibious Vehicle (AAV) as it must now remain in service longer than originally anticipated. The EFV restructure requires our Operational Forces to keep the AAV running longer and delays their access to the increased capabilities EFV will provide.

9. Senator TALENT. General Magnus, is the Marine Corps committed to the EFV program?

General MAGNUS. Yes, as a principal enabler of our emerging concepts of Expeditionary Maneuver Warfare (particularly Ship To Objective Maneuver) and Seabasing, the Marine Corps is fully committed to the EFV program. It remains our number one ground acquisition program.

10. Senator TALENT. General Magnus, how do you think the EFV program will fare coming out of the QDR?

General MAGNUS. I believe the EFV program will fare exceptionally well coming out of the QDR. When the capabilities of this system are examined in their entirety, one finds that the EFV brings much more to the Joint Force Commander than a credible forcible entry capability. While forcible entry executed from over the horizon was the genesis of the EFV, the survivability, force protection (to include NBC collective protection), mobility, and lethality requirements levied upon this system will provide our maneuver forces with a world class armored personnel carrier to meet the challenges we will face in the 21st century.

11. Senator TALENT. Secretary Young, with total program costs approaching $13 billion, do you have concerns regarding the affordability of the program?

Mr. YOUNG. I will always be concerned about maximizing the affordability of programs. However, with the EFV program investment costs at approximately $12.6 billion, we will field 1,013 highly-capable EFVs to the Operating Forces with water and land mobility, direct fire lethality, survivability, and command and control capabilities that are significantly enhanced from the capabilities we have on the battlefield today. EFV is critical to the combat projection and tactical mobility of the marine maneuver forces ashore and we are committed to providing this much-needed capability.

MV–22 OSPREY

12. Senator TALENT. Secretary Young, Admiral Sestak, General Magnus, and General Mattis, since two fatal mishaps in calendar year 2000, the MV–22 Osprey has been redesigned and testing was resumed. It is now in its operational test phase. Section 123 of the National Defense Authorization Act for Fiscal Year 2002 keeps the program at minimum sustaining rate (11 aircraft) until the Secretary of Defense certifies that the aircraft's previous problems have been resolved through operational testing. We are aware that the MV–22 is going through its operational testing. Can you give us any information on how the testing is going?

Mr. YOUNG, Admiral SESTAK, General MAGNUS, and General MATTIS. The V–22 was certified ready for operational evaluation on February 24, 2005. Under the auspices of the Navy's Commander, Operational Test and Evaluation Force, the Marine Tiltrotor Operational Test Squadron, VMX–22, formally began the V22 OPEVAL (OT–IIG) on March 28, 2005. It is ongoing today with an estimated completion at the end of June or beginning of July. The independent test community will not release a report until the testing is complete, as such, it would be inappropriate to comment on OPEVAL progress at this time.

13. Senator TALENT. Secretary Young, Admiral Sestak, General Magnus, and General Mattis, can we expect that we will be seeing the Secretary of Defense's certification that the aircraft's previous problems have been resolved?

Mr. YOUNG, Admiral SESTAK, General MAGNUS, and General MATTIS. Yes. Section 123 compliance documentation will be forwarded to USD(AT&L) on May 10, 2005, to support Section 123 Certification to Congress. The documentation package contains both the Commander, Operational Test and Evaluation Force (COTF) Letter of Observation as well as an independent assessment by OUSD(AT&L) DS/SE/AS in support of section 123 compliance. Both documents concluded that the MV–22 Block A has operationally demonstrated compliance with the four key areas (hydraulic system components and flight control software, reliability and maintainability, operations with other MV–22 and other types of aircraft, and downwash effects) cited in section 123 of the National Defense Authorization Act for Fiscal Year 2002.

14. Senator TALENT. Secretary Young, Admiral Sestak, General Magnus, and General Mattis, how much more costly do you expect the MV–22 to be from earlier estimates?

Mr. YOUNG, Admiral SESTAK, General MAGNUS, and General MATTIS. The program office is working to support the CAIG Independent Cost Estimate for the MS–III FRP decision. Overall costs and requirements are largely understood and much data exists with respect to building V–22 production aircraft forming the basis of the Program Office estimate and likely the CAIG estimate. However, the CAIG's final position will not be complete until the August/September timeframe in support of the DAB decision.

[Whereupon, at 4:40 p.m. the subcommittee adjourned.]